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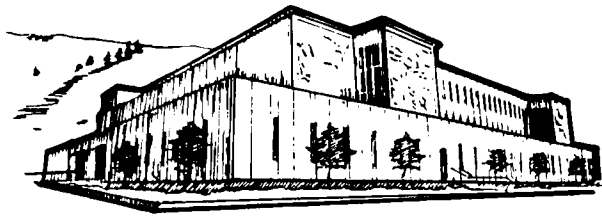
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University of
Montana

HEARING AID CANDIDATES' PERCEPTIONS ON
AMPLIFICATION SYSTEMS: A PRE-FITTING
TO POST-FITTING ANALYSIS

By:

Jamie A. Small

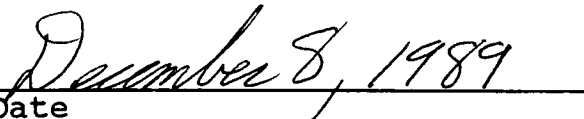
B.A., University of Montana, 1982

Presented in partial fulfillment of the requirements
for the degree of
Master of Arts
University of Montana
1989

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ABSTRACT

Small, Jamie A., December 8, 1989;

Communication Sciences
and Disorders

Hearing aid candidates' perceptions on amplification systems: a pre-fitting to post-fitting analysis

Director: Michael K. Wynne



The purpose of the present study was to assess the attitudes and belief systems of first-time hearing aid users at three points in time: prior to any audiological testing, following initial audiological testing and discussion of those test results with the audiologist, and following a 30 day trial with a hearing aid. A questionnaire was developed which required subjects to rank their agreement or disagreement, on a scale of one to five, with a series of statements regarding hearing loss and hearing aids. Three audiological facilities participated in distributing the questionnaires to their clients. Seventeen complete sets of questionnaires were returned to the investigator. The questionnaires were evaluated for change across the three assessment times. The findings of this study indicated that the subjects, as a group, did not adhere to most of the common misconceptions about hearing loss and hearing aids prior to obtaining audiological information and, furthermore, their opinions were not strongly altered by the trial use of a hearing aid. The subjects also expressed a high degree of confidence in the audiologists who fit them. All of the subjects were satisfied with their fittings and purchased their hearing aid(s). The results are discussed in view of the limitations imposed by the low return rate and poor audiologist cooperation.

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CHAPTER 1: INTRODUCTION

There is a well documented rise in the prevalence of hearing loss as a function of age. Figures taken from the Metropolitan Life Insurance Company (1976) estimated the prevalence of hearing loss to be 23% for persons between the ages of 65 and 74 rising to almost 40% for persons 75 and older. The Subcommittee on Consumer Interests of the Elderly (1987) put the number of binaural hearing aid candidates, aged 65 and older, at 6.25 million. Of these, only 21% were reportedly using a hearing aid. Similarly, a 1980 Gallup poll showed that 18% of respondents who acknowledged that they had a hearing loss actually owned a hearing aid. More recently, the National Institute on Aging (1987) cited estimates from four cities which yielded figures as high as 96% for persons between the ages of 65 and 69 who had never worn a hearing aid.

Clearly, the majority of adults who are hearing aid candidates have never attempted amplification. The literature indicates a reluctance on the part of adults to recognize the existence of hearing loss as well as the communication problems created by it (Alpiner, 1987). Research has documented the existence of a "hearing aid effect" wherein hearing aid wearers are perceived as being less capable on a variety of dimensions than non hearing aid wearers (Mulac, Danhauer, and Johnson 1981; Johnson, Danhauer, and Edwards 1982).

Various studies have attempted to explain and categorize the reasons why people choose not to keep or wear a hearing aid (Mahoney, 1972; Pollack, 1977; Surr et al., 1978; Cunningham, 1978) and the consistency of their results is noteworthy. Generally, the reasons for the rejection of hearing aids can be attributed to either direct hearing aid problems or associated hearing aid problems. Various problems such as listening in background noise or groups, feedback, and poor sound quality have been prominent among the reasons in the direct category. Problems such as cost, battery life, earmold fit, discomfort, lack of need and inconvenience have been the reasons included under the associated category.

Recently, Franks and Beckman (1985) investigated 32 possible reasons for hearing aid rejection among elderly users. In addition to the reasons delineated in some of the previous studies, the authors surveyed their subjects' responses to factors such as: calling attention to the hearing loss, mistrust of dealers, fear of making the wrong choice, and family didn't feel it was needed.

The present study sought to examine some of the factors studied by Franks and Beckman as well as some additional factors that have been found to be common perceptions among new hearing aid users. The intent of this study was to survey the attitudes of hearing aid users at three points in time: prior to any testing or counselling, following

audiometric testing and counselling, and after a thirty day trial with amplification. Specifically, the question of interest to this study was: if new hearing aid users are surveyed before audiological testing, following testing and counselling, and following a 30 day trial period with a hearing aid, how will their perceptions change over the course of this time period?

CHAPTER 2: LITERATURE REVIEW

The determination of an appropriate hearing aid for the individual user is undoubtedly a primary goal among dispensers of hearing aids. The manner in which this can be achieved is a matter of ongoing debate and research.

Initially, some decisions must be made regarding the desired electroacoustic characteristics of a hearing aid for any given person. While many strategies are available, it is unclear which, if any, of these guidelines constitute an optimal method.

Frequency Response

There is general agreement that both low and high frequencies are critical for speech perception. The fitting of most hearing losses requires a high frequency emphasis (Duffy and Zelnick, 1985). There is, however, some question as to how much low frequency amplification is needed for an optimal fitting. Mueller and Grimes (1987) cited amplified background noise and the upward spread of masking as reasons for limiting low frequency amplification. Yet, a study by Skinner et al. (1982) indicated that the highest speech recognition scores were obtained with a broad band amplifier providing a high frequency emphasis. The question seems to be: at what point does low frequency gain cease to be beneficial and begin to be detrimental?

Gain

Most of the early formulas for gain requirements, i.e., the half-gain rule and mirroring the audiogram, were found to either over-amplify (mirroring) or under-amplify (half-gain) the high frequencies. The use of equal loudness contours enjoyed some popularity as a means for gain determination but was considered too time-consuming by most clinicians (Duffy and Zelnick, 1985). Duffy and Zelnick suggested that the use volume setting should correspond to the reference test position. Regardless of the method, there has been agreement that two factors should be considered when determining gain: 1) that the user's loudness discomfort level (LDL) should not be exceeded, and 2) that the hearing aid should have sufficient gain so as to not require a full-on volume setting for daily use (Berger and Hagberg, 1982).

SSPL-90

The most critical element in selecting the SSPL-90 of a hearing aid is to not exceed the user's LDL. Mueller and Grimes (1987) described four outcomes to which the user is likely to resort if the hearing aid's output exceeds the user's LDL: 1) the volume is maintained at a less-than-optimal setting, 2) the volume is quickly reduced whenever a loud sound is anticipated, 3) hearing the aid is worn primarily in quiet listening situations, or 4) the use of the hearing aid is discontinued. Clearly, the accurate

measurement of the LDL is crucial. Because there exists a wide variation in LDL measurement techniques, Beattie et al. (1980) stressed that instructions must be clear and consistent during these measurements.

Compression

Related to the SSPL-90 are the decisions as to when and/or how to incorporate compression or output limiting. Typically, compression has been accomplished in one of three ways: 1) peak-clipping in which the peaks of the input signal are eliminated when the limit of the hearing aid transistor is reached, 2) output compression in which the magnitude of the amplification is decreased if it exceeds a predetermined level, or 3) input compression in which a decrease in amplification occurs prior to the gain control so that the signal is modified at all input levels. Mueller and Grimes (1987) described three situations for which compression would be considered appropriate:

- 1) to prevent the LDL from exceeding the SSPL-90, use output compression or peak-clipping,
- 2) to maintain the user's MCL, use input compression,
- 3) for a reduced dynamic range, use output or input compression.

Finally, the authors noted that there is more distortion with peak-clipping than with output compression and concluded that there remains little reason to resort to peak-clipping over output compression. Since output

compression allows for a truer reproduction of the signal than peak-clipping, this line of reasoning seems sound.

Sound Field Measurements

Once the hearing aid selection process has been completed, the user's aided performance is usually evaluated while on the user. Traditionally, this has meant testing thresholds and speech in sound field in both aided and unaided conditions. In defense of the traditional sound field measurements, Duffy and Zelnick have proclaimed: "The only valid information regarding the amplification provided by a hearing aid while it is being worn . . . is that obtained through sound field measurements (p. 20)." Aided threshold measurements to determine functional gain are currently widely used in hearing aid assessment. Functional gain can be described as the difference in thresholds when measured in both the aided and unaided condition. However, Mueller and Grimes (1987) have warned that this type of measurement is "fraught with sources of variability (p.141)" that include:

- 1) standing waves in the sound field,
- 2) non-test ear participation,
- 3) questionable reliability if the difference between the aided and unaided threshold is 10 dB or less, and

- 4) questionable face validity because the situation has little resemblance to listening situations experienced by the user.

Without question the most controversial matter regarding aided sound field measurements has been the use of word recognition tests. The limitations of this procedure have been described in several studies (Thornton and Raffin, 1978; Schwartz and Walden, 1983; Walden et al., 1983). Chief among the complaints is that differences between word recognition scores can more often be attributed to speech material variability than to any real difference in word recognition ability. Indeed, a study by Mueller and Grimes (1983) of test-retest differences for repeated trials with the same hearing aid showed less agreement than did a similar study conducted using different hearing aids (Walden et al., 1983). An earlier study by Duffy (1978) advocated the use of phonemic rather than whole word scoring as a solution to this problem. In an effort to circumvent the problems confronted when using monosyllabic word recognition tests, Hayes et al. (1983) have advocated using the SSI (Synthetic Sentence Identification) test for hearing aid evaluation. These authors surveyed hearing aid users, all of whom had been evaluated using the SSI at five MCRs (message-to-competition ratios). They then divided the subjects into four subgroups: those who found their hearing aid very helpful, satisfactory, sometimes helpful, and

unsatisfactory. They found that the more satisfied users (very helpful and satisfactory) scored an average of 30% better on the SSI at an MCR of -10 dB.

Probe Microphone Measurements

Recent developments in hearing aid measurement have been seen by some audiologists as an answer to some of the difficulties associated with traditional sound field measurements. Foremost among these new developments is probe microphone measurement. The primary use of these systems is to measure insertion gain which Mueller and Grimes (1987) described as "an electroacoustic corollary to functional gain (p. 143)." Currently, many advocates of probe microphone measurements are suggesting that they be used as an adjunct to the more traditional procedures (McCandless and Lyregaard, 1983; Schachterle, 1986). Mueller and Grimes (1987) outlined the following advantages of probe microphones:

- 1) variability of subject threshold response is virtually eliminated,
- 2) information is obtained across the entire frequency range,
- 3) there is no contamination from room noise,
- 4) the necessity for a test room is eliminated, and
- 5) the measures are time efficient (p. 143).

Contrary to the enthusiasm for probe microphone measurements, Duffy and Zelnick (1985) warned that they are

actually of limited value asserting that they are less reliable than measurements obtained from hearing aid test box analyzers. They elaborated that:

- 1) probe measurements are only recommended for mild-to-moderate hearing losses,
- 2) the presence of the tube or microphone changes the ear canal resonance,
- 3) very tight fitting earmolds will collapse the tube, and
- 4) no real information on how the person hears is provided (p. 18).

Until research can prove that sound field or probe microphone measurements are clearly superior to the other, an approach which combines the two measurements is advisable at this time.

Quality Judgments

User judgments of sound quality have received some attention in recent publications. Much of this work has focused on what effect low frequency amplification has on perceived sound quality. A primary finding indicated that listeners preferred hearing aids with lower, low cut-off frequencies (Punch, 1981). However, earlier research has suggested that enhancing low frequency amplification can negatively affect the user's speech intelligibility (Danaher and Pickett, 1975; Harris and Goldstein, 1979). This is in stark contrast to a more recent study by Punch and Beck

(1986) which showed that a low frequency emphasis failed to cause deterioration of syllable recognition scores in quiet or noise. However, the authors were careful to delineate the specifics of the methodology used and did not attempt to create the impression that their results could be widely generalized. A review of the available literature indicates that these contradictory findings may be due, in part, to the variability of quality judgments. Witter and Goldstein (1980) found that quality judgments could be influenced by the stimulus used--male and female voices resulted in different overall rankings from their subjects. Punch and Parker (1981) indicated that different instructional sets resulted in outcomes that correlated poorly with one another. Logan et al. (1984) found that judgments varied depending upon whether the subject was in a sound booth or a reverberant room. To lessen this variability, Mueller and Grimes (1987) stated that if quality judgments are to be used, a "real life" listening task should be constructed. They suggested that this task would involve sentence length materials or continuous discourse presented in a reverberant room and in the presence of background noise.

Hearing Aid Acceptance

Terminology

Generally, the literature discussing the acceptance of hearing aids has utilized various key words to refer to this concept. The words most commonly included are use,

satisfaction, and benefit. Unfortunately, the definition of these words varies dramatically from study to study.

Of these terms, the word "use" is perhaps the most easily defined as referring to the number of hours per day that a hearing aid is worn. Presumably, this measurement has been used as an indirect means of assessing acceptance because of its obvious face validity. Although some researchers have reported on hearing aid use without making any reference to satisfaction (Hutton, 1985), most have tended to examine use in conjunction with some measure of benefit and/or satisfaction (Brooks and Bulmer, 1981; Pou et al., 1981; Oja and Schow, 1984; Hosford-Dunn and Baxter, 1985). While Rupp's Feasibility Scale for Predicting Hearing Aid Use purports to be a means of predicting use, Rupp (1982) states that it can be used to indicate "the likelihood of successful amplification (p, 10)" inferring that "use" is synonymous with success.

Oja and Schow (1984) defined hearing aid benefit as "the improvement in some measure in the aided condition as compared to the unaided condition" (p. 77) which, for their study, meant functional gain and speech intelligibility scores. Hosford-Dunn and Baxter (1985) provided the following operational definition of benefit: "the amount of improvement in everyday listening situations where type of improvement refers to documented changes in post-fitting speech communication ability and to self-reports of wearer

satisfaction" (p.36). Thus, Hosford-Dunn and Baxter defined satisfaction as an integral part of benefit. Satisfaction, being a much more abstract concept, has been defined more subjectively. Schachterle (1986) has observed that the user will ultimately express satisfaction in limited ways which include keeping the hearing aid, the number of return visits required for modifications, and the referral of others to the dispensary. However, the most common method of satisfaction measurement appears to be through questionnaires in which certain factors are selected, usually based on the author's opinion of what is relevant to satisfaction (Brooks and Bulmer, 1981; Pou et al., 1981; Franks and Beckman, 1985).

Obviously, the literature has been somewhat indistinct regarding an operational definition of hearing aid user satisfaction. The terminology, while not interchangeable, shows considerable overlap.

Prediction of Success

In an effort to assure user satisfaction and decrease return rates, several researchers have attempted to identify those methods which can predict who are the better candidates or who will achieve success with amplification. The most obvious means of accomplishing this is to show some correlation between the user's success and the available audiometric data. There can be little doubt that audiometric factors must be considered, but there is

considerable debate as to what degree they should be relied on. Berger and Millin (1980) have declared that "the decision of who should have a hearing aid . . . is based primarily on audiometric test results (p. 56)." However, Mueller and Grimes (1987) have countered that "Pure tone sensitivity, although perhaps the easiest to measure, is only one of several elements that can be used to predict success with amplification (p. 115).

Pascoe (1985) argued that it is the way in which audiometric data are used that can be misleading in the prediction of hearing aid success. He noted two weaknesses of commonly-used classification systems:

- 1) the use of categories such as mild or moderate does not always represent the status of borderline cases, and,
- 2) the use of categories based on speech reception thresholds and pure tone averages of 500, 1000, and 2000 Hz tend to underestimate the importance of high frequency hearing loss (p. 936).

Pascoe's solution was to develop a classification system which estimates hearing aid usefulness by incorporating a severity rating, based on the pure tone average of 1000, 2000, and 4000 Hz, as well as a positive or negative motivational rating.

Perhaps the best-known tool for prediction of hearing aid use is Rupp's Feasibility Scale for Predicting Hearing

Aid Use (FSPHAU) (Rupp, 1982). Rupp's scale consists of eleven weighted factors to be rated by the dispenser. The factors included are: motivation, self-evaluation, determination of cause, magnitude of hearing loss, commentary, adaptability, age, manual dexterity, vision, financial capability, and availability of a significant support person. The final score is compared to a breakdown of scores provided along with an indication of candidacy: 76 to 100% = positive, 61 to 75% = equivocal, 41 to 60% = limited, less than 40% = limited. It is noteworthy that Hosford-Dunn and Baxter (1985) undertook reliability and validity testing of the Rupp scale and they reported a low correlation between user success and FSPHAU scores.

Surveys of Hearing Aid Success

Although researchers acknowledge that there are problems inherent in survey data, some facets of hearing aid use would be difficult to measure in any other form. Survey questionnaires have tended to be used to assess attitudes toward, perceived benefit from, and overall satisfaction with hearing aid use. Following are descriptions of surveys that have investigated some aspect of hearing aid success.

Franks and Beckman's (1985) study was designed to obtain the reasons for hearing aid rejection in the elderly. They surveyed 100 people over the age of 65 who were evenly divided into the following groups: 1) normal hearing persons, 2) hearing-impaired persons who had never worn a

hearing aid, 3) hearing-impaired persons who had worn but rejected a hearing aid, and 4) hearing-impaired persons who were currently wearing a hearing aid. The survey consisted of 32 possible reasons for rejection of hearing aids which the authors selected on the basis of a review of the literature and their own experience. The choices available included factors relating to sound quality, manipulation of the hearing aid, perceptions of hearing aid dealers, and feedback from family and friends. Each reason was ranked on a scale of one to seven with one indicating strong agreement with the statement and seven indicating strong disagreement with the statement. The results were examined for ranked prominence of reasons for rejection and for differences between groups.

Statistical analysis of the ranked rejection factors showed no statistical difference between factors ranked one (cost) and two (calls attention to handicap) or for factors ranked three through 32. The authors noted good consistency in that seven factors were among the top ten reasons for all groups. Overall, the top ten reasons for hearing aid rejection were: hearing aids cost too much, hearing aids call attention to handicap, hearing aid dealers use deceptive practices, hearing aids amplify noise, hearing aids are inconvenient to wear, hearing aid dealers use high pressure, hearing aids are difficult to manipulate, hearing aid dealers are only interested in money, they would not

know where to buy a hearing aid, hearing aids make sounds too loud, and dealers are not trained.

A comparison of the four groups showed that the normal hearing group and the group of hearing-impaired persons who had never tried a hearing aid differed significantly on only two items. The group who had worn but rejected a hearing aid had the most negative responses, and the group currently wearing a hearing aid had the most positive responses. These results would indicate that either satisfied users are more likely to keep their hearing aids, or that users become more satisfied with the continued use of amplification.

Franks and Beckman stressed that the issue of expense must somehow be dealt with and that cosmetic factors should continue to receive attention. They also noted the negative attitudes expressed regarding hearing aid dealers (the questionnaire did not specify audiologist). However, in light of the lack of statistical differences obtained, it is difficult to generalize to any large degree from this study.

Oja and Schow (1984) conducted a study investigating a protocol they designed which measured benefit, use, and satisfaction from hearing aids. They measured hearing aid benefit audiometrically via functional gain and word intelligibility scores. Hearing aid use and satisfaction were assessed through their questionnaire based on the week prior to the audiological testing. Forty five subjects, age 18 or older, participated in the study and were categorized

according to both low- and high-frequency hearing losses. The questionnaire asked subjects to indicate their estimated use and general satisfaction with their hearing aid.

The satisfaction portion of the questionnaire required only that "general satisfaction" be rated on a seven point scale rather than requiring responses to a variety of factors. Responses to the satisfaction scale indicated that 67% of the subjects were satisfied to some degree. The authors noted that 89% of the subjects fitted by audiologists were satisfied while only 50% of the subjects fitted by others were satisfied. Unfortunately, correlations between the measures in this study were low indicating that hearing aid benefit, use, and satisfaction were largely unrelated. The authors noted the possibility that other factors could contribute to use and satisfaction without affecting benefit. They mentioned factors such as venting and compression as examples.

Pou et al. (1981) investigated the user's adjustment to and acceptance of hearing aids as part of a general study of the dispensing effectiveness for a combined otolaryngology and audiology clinic. Adjustment to and satisfaction with the hearing aid were measured using a questionnaire consisting of 17 items. Specific questions were selected beforehand which were felt to correlate with the areas under investigation. Four questions were intended to determine satisfaction and three questions were intended to determine

acceptance. The responses were cross-tabulated using a computer program looking for patterns and relationships. The authors reported that the statistical analysis "showed an overwhelming strong positive response to all questions answered" (p.1077). They also reported that responses were 10 to 25% less favorable among subjects who felt that cost was inappropriate, and that benefits appeared to break down in the presence of background noise. It should be noted that the majority of subjects in this study rated themselves as highly motivated or willing but reluctant. The authors interpreted this to mean that unmotivated persons were not fit with a hearing aid at their clinic. This also limits the usefulness of the results as it does not address how less motivated persons might have responded.

Brooks and Bulmer (1981), in a British study, surveyed 204 binaural hearing aid users to determine the use of, attitudes to, and satisfaction with binaural hearing aids. The subjects were 16 years of age or older. Brooks and Bulmer pointed out that they obtained a 91% return rate with the survey which they interpreted as a positive sign of general satisfaction. The survey was made up of 20 questions. These authors also reported high levels of satisfaction for the majority of users with background noise again being identified as the factor which creates the greatest degree of difficulty.

According to the Brooks and Bulmer, all of the aids were provided to the subjects by the British National Health Service; therefore, factors related to the expense of hearing aids would not have entered into this study. The authors did not speculate on how these factors could have affected the outcome of the survey, but it seems legitimate to interpret these findings with some skepticism in light of the prominent role cost has played in the other studies.

Mechanical versus Psychosocial Considerations

Common sense would dictate that rejection of hearing aids could largely stem from an inappropriate fitting. Indeed, Wernick (1985) reported on return rates for in-the-ear hearing aids as it relates to severity of hearing loss. He found that persons on both the mild and severe extremes of the audiogram made poorer candidates for in-the-ear hearing aids. If the average hearing loss was less than 35 dB HL or greater than 75 dB HL the return rate increased significantly over the average return rate of 10% for all in-the-ear hearing aids shipped.

Although it is clearly understandable that an improper fit would lead to rejection of a hearing aid, it may more often be the case that a lack of adequate preparation is to blame (Hodgson, 1981). Kapteyn (1979) reported that despite various complaints of hearing aid users (feedback, poorly fitting earmolds, sounds amplified too much), patients generally did not contact the dispenser even though they had

been instructed to do so. Thus it appears that if adequate follow-up and counselling are not instigated by the dispenser they will probably not be pursued by the user. Hodgson (1981) cautioned that new hearing aid users must "be introduced to amplification at a rate and in a fashion to promote successful experiences and prevent them from being overwhelmed with too much sound or too many unclear signals" (p. 222). Brooks (1979) found that, by following a program which included regular follow-up visits, hearing aid users wore their hearing aids one and a half to two times more than did a similar group who did not receive the follow-up visits.

Kapteyn's (1977) study led him to question whether psychosocial factors might not be more important than auditory factors with regards to hearing aid satisfaction. He found only a weak relationship between user satisfaction and magnitude of hearing loss or discrimination ability six months post-fitting.

Research has supported the probability that self-image can contribute a great deal toward successful hearing aid use. Harless and McConnell (1982) found that a group of successful hearing aid users were rated higher in overall self-concept than was a similar group who had chosen to postpone initiation of hearing aid use. Stephens (1980) found that embarrassment was the leading psychological problem for a group of hearing-impaired patients indicating

that such feelings could prevent an individual from trying a hearing aid.

A part of the problem may also be that prospective users are not being prepared for what to expect from a hearing aid. Niemeyer (1973) pointed out that new users often expect that the somewhat painful decision to get a hearing aid will be rewarded by optimum results. Hodgson (1981) noted that it behooves the hearing aid dispenser to provide the potential user with realistic expectations and an understanding of the limitations of amplification systems. In addition, he explained that the hearing-impaired person must accept that certain behaviors and listening habits may require modification.

There are, however, some problems specific to the elderly population which are not as easily resolved. Kasten (1981) explained that difficulties experienced by younger hearing aid users tend to be accentuated for many elderly persons due to conditions such as: markedly reduced leadership positions, lessened adaptability, a tendency toward conservatism, restricted mobility, and a restricted income level (p.228). These factors, in addition to the phenomenon described by Hodgson (1981) for persons to adapt to hearing loss because of the usually gradual onset, would certainly appear to contribute to a tendency to deny or at least postpone the need for a hearing aid.

In summary, there is not yet a definitive means of accomplishing a successful match between an individual and a particular hearing aid. As Hodgson (1985) stated: " . . . the audiologic, otologic, psychologic and social problems associated with hearing loss are not reacted to in a uniform way by the hearing-impaired population" (p. 952).

Statement of the Problem

The literature indicates many commonalities among dissatisfactions of hearing aid users. However, relatively few studies have addressed the possibility that first-time hearing aid users may bring some misconceptions to the experience which, in turn, affect their satisfaction with the hearing aid. Specifically, this study investigated the belief systems and perceptions of first-time hearing aid users in regards to the hearing aid benefits at their initial appointment, at their hearing aid fitting appointment, and at the end of a thirty day trial period.

CHAPTER 3: METHODS

Subjects

Subjects for this study consisted of seventeen persons who were seen by one of three audiologists. All subjects were a minimum of 50 years old and had a sensorineural hearing loss with a three frequency pure tone average (PTA) of 30 dB HL or worse at .5, 1, and 2 kHz. Participants were prospective first-time hearing aid users. Subjects were excluded if hearing aid payment was covered by insurance.

Survey Instrument

Each subject completed a pre-fitting questionnaire prior to any audiological testing or counselling by the audiologist. A second questionnaire was completed prior to a hearing aid fitting. A post-fitting questionnaire was completed after thirty days of trial hearing aid use. The three questionnaires are presented in Appendices A through C.

The questionnaires contained statements reflecting possible perceptions of hearing loss and hearing aids. Statements related to perceptions of the audiological facility and the service provided were included on the fitting and post-fitting questionnaires only. All of the statements were rated on a scale of one to five with one indicating strong agreement and five indicating strong disagreement. Inclusion of the stated perceptions was based on the review of pertinent literature. Ultimately, an

effort was made to select those factors shown to be most germane to hearing aid satisfaction.

Procedures

Six audiologists agreed to participate in this study. Twenty sets of the questionnaires were provided to each of the audiological facilities. Each audiologist received written instructions regarding the administration of the questionnaires. The written instructions are presented in Appendix D. The questionnaires were coded to insure that each subjects included in the data analysis completed all three parts. Receptionists at the individual facilities were asked to provide the questionnaires in an effort to minimize any effect the audiologist could have regarding how the questionnaires were answered.

A pre-fitting questionnaire was provided to prospective hearing aid users upon arrival for their initial hearing evaluation. The fitting questionnaires were completed after the audiologist had completed all testing and hearing aid counselling. A post-fitting questionnaire was provided to the subjects following a thirty day trial period. All of the completed coded questionnaires were returned to the investigator by mail.

Approximately five months into the study, inadequate return rate necessitated intervention by the investigator. Only three audiologists were actually participating in the study and many subjects were not completing all three parts

of the survey. Therefore, the participating audiologists were contacted and asked to obtain permission from subjects who had not completed all three parts of the survey for the investigator to contact them by phone. As a result, three subjects were contacted by phone and their surveys were completed orally.

A further effort to improve the return rate involved providing the audiologists with postcards to send to subjects. The postcards were to be returned to the investigator with the subject's name and phone number if permission was given for the investigator to make contact by phone. Only one postcard was returned to the investigator. At this point, time constraints required that the study be completed with a much lower number of subjects than was originally planned.

The returned surveys were examined for changes in the hearing aid users' perceptions over the course of the three questionnaires as well as for satisfaction with the audiological services provided.

CHAPTER 4: RESULTS

In an effort to determine the change in hearing aid user perception over the course of a hearing aid fitting and subsequent thirty day trial, 120 sets of questionnaires were sent to six audiological facilities (20 per facility) in June of 1988. The subjects were asked to complete the pre-fitting questionnaires before receiving any audiological testing and before any discussion had occurred with the audiologist. The fitting questionnaires were completed following the subjects' audiological testing and the discussion of their test results with the audiologist. The subjects completed the post-fitting questionnaires following a thirty day trial with their hearing aid(s).

Questionnaire responses were tallied and the mean response for each statement on each of the questionnaires was calculated in order to evaluate changes that occurred over the course of time. This information is presented in Tables 4.1 through 4.6. For descriptive purposes, the perceptions addressed on the questionnaires were grouped into the following categories: 1) acoustic perceptions, 2) psychological perceptions, 3) social perceptions, 4) spurious perceptions, 5) external perceptions, 6) service-related perceptions and 7) use and satisfaction (Table 4.1). The reader should bear in mind that the scale on the questionnaires ranged from one (strongly agree) to five (strongly disagree).

Table 1. Mean responses and shifts for the acoustic category of statements.

Question	Mean Rating			Shift		
	Pre	Fit	Post	Pre-Fit	Fit-Post	Pre-Post
A hearing aid is helpful for understanding speech in background noise.	1.82	1.71	2.88	0.11	1.17	1.06
A hearing aid makes sounds too loud.	3.12	3.76	3.71	0.64	0.05	0.59

Table 2. Mean responses and shifts for the psychological category of statements.

Question	Mean Rating			Shift		
	Pre	Fit	Post	Pre-Fit	Fit-Post	Pre-Post
I would not want a hearing aid to be visible to others.	3.06	3.24	3.06	0.18	0.18	0.00
A hearing aid would make me nervous.	3.76	3.88	4.06	0.12	0.18	0.18
Hearing aids are a sign of aging	3.35	3.88	4.25	0.53	0.37	0.90
A hearing aid makes you appear inferior to others.	4.35	4.59	4.29	0.24	0.30	0.06
Two hearing aids makes you look twice as impaired.	3.00	3.41	3.82	0.41	0.41	0.82
I do not think a hearing aid would help me.	3.94	4.29	4.41	0.35	0.12	0.47
I am afraid that I would not get the right hearing aid.	3.41	4.00	3.76	0.59	0.24	0.35

Table 3. Mean responses and shifts for the social category of statements.

Question	Mean Rating			Shift		
	Pre	Fit	Post	Pre-Fit	Fit-Post	Pre-Post
My family is not supportive of my trying a hearing aid.	4.41	4.65	4.53	0.24	0.12	0.12
People I know with hearing aids are dissatisfied with them.	3.53	3.53	3.53	0.00	0.00	0.00
Others have suggest a hearing aid but I do not think I need one.	4.24	4.24	4.29	0.00	0.05	0.05

Table 4. Mean responses and shifts for the spurious category of statements.

Question	Rating			Shift		
	Pre	Fit	Post	Pre-Fit	Fit-Post	Pre-Post
Hearing aids are only for the most severe losses.	3.76	4.06	4.12	0.30	0.06	0.36
Hearing aids should restore hearing to normal.	2.00	2.47	2.41	0.47	0.06	0.41
People with nerve deafness can not use hearing aids.	3.59	3.76	3.76	0.17	0.00	0.17
People with hearing aids can tolerate more loudness than others.	3.94	4.53	4.12	0.59	0.41	0.18
People can either hear normally or they are deaf.	4.06	4.29	4.65	0.23	0.36	0.59

Table 5. Mean responses and shifts for the external category of statements.

Question	Mean Rating			Shift		
	Pre	Fit	Post	Pre-Fit	Fit-Post	Pre-Post
Controls on hearing aids are difficult to adjust.	2.94	3.88	3.70	0.94	0.18	0.76
Hearing aids are overpriced.	1.94	2.53	2.94	0.59	0.41	0.10
Hearing aids are uncomfortable to wear.	2.94	3.00	3.88	0.06	0.88	0.94

Table 6. Mean responses and shifts for the service category of statements.

Question	Mean Fit	Rating Post	Shift Fit-Post
The audiologist adequately explained my hearing loss to me.	1.06	1.35	0.29
I would refer others to this office/clinic.	1.24	1.12	0.12
The audiologist adequately explained the use of the hearing aid to me.	1.18	1.29	0.11

Acoustic Perceptions

Statements on the questionnaires that addressed acoustic perceptions included "A hearing aid is helpful for understanding speech in the presence of background noise," and " A hearing aid makes sounds too loud."

Figures 4.1 and 4.2 illustrate the questionnaire results for the acoustic category. Subjects showed strong agreement with the statement "A hearing aid is helpful for understanding speech in the presence of most types of background noise" on the pre-fitting and fitting questionnaires; however, the distribution of responses shifted toward neutrality on the post-fitting questionnaire. While the subjects' responses tended to show neutrality for the statement "Hearing aids make sounds too loud" on the pre-fitting questionnaire, they shifted toward disagreement for the fitting and post-fitting questionnaires.

Psychological Perceptions

Statements that addressed psychological perceptions included: "I wouldn't want a hearing aid to be visible to others," "A hearing aid would make me nervous," "Hearing aids are a sign of aging," "A hearing aid makes you appear inferior to others," "Two hearing aids make you look twice as hearing impaired," "I don't think a hearing aid would help me," and "I am afraid that I would not get the right hearing aid."

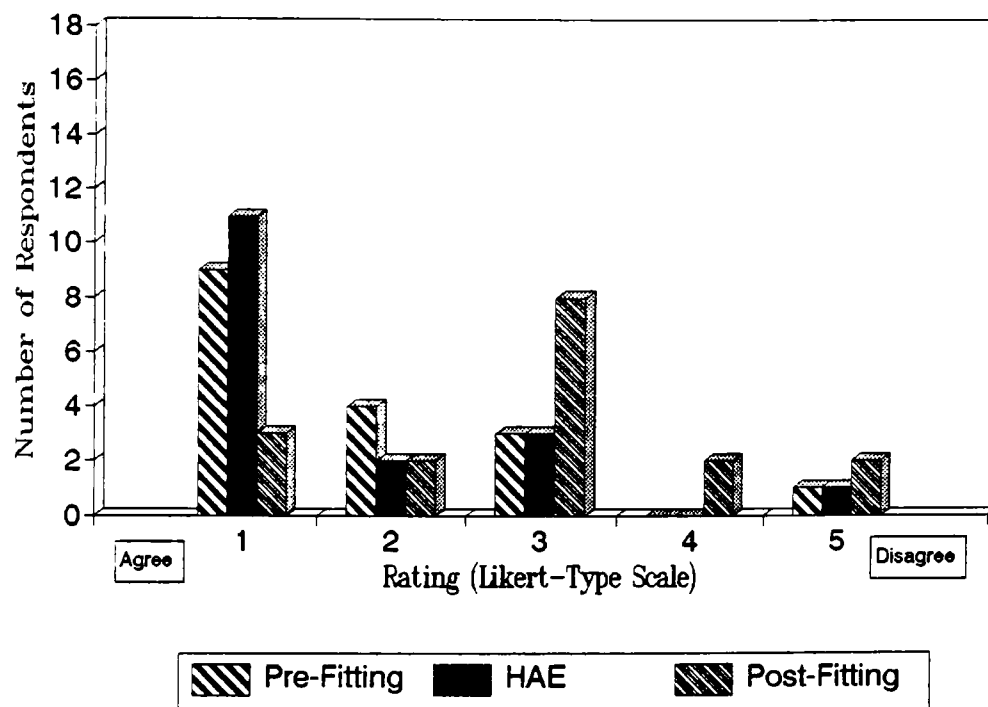


Figure 4.1. Distribution of responses to the statement "A hearing aid is helpful for understanding speech in background noise."

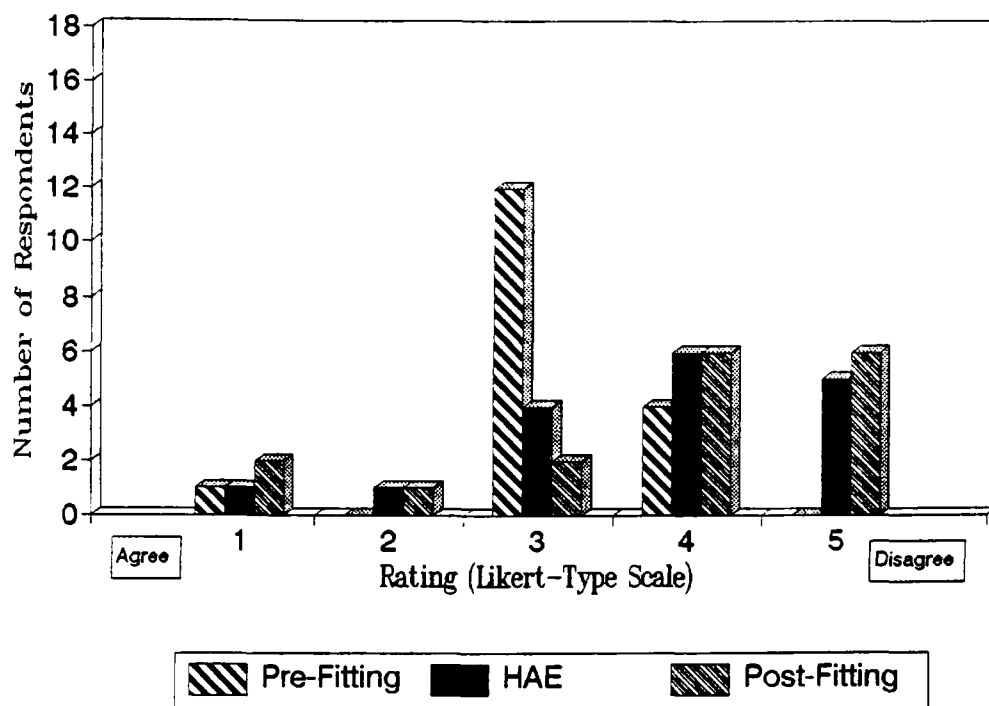


Figure 4.2. Distribution of responses to the statement "A hearing aid makes sounds too loud."

Figure 4.3 illustrates the subjects' responses to the statement "I would not want a hearing aid to be visible to others." Little change was noted across the questionnaires with the majority of subject responses suggesting neutrality. Figures 4.4 and 4.5 illustrate the responses to the statements "A hearing aid would make me nervous" and "Hearing aids are a sign of aging." The subjects' responses to the pre-fitting questionnaires were essentially neutral whereas their responses to the fitting and post-fitting questionnaires indicated a general disagreement with these statements. Subjects disagreed, across all three questionnaires, with the following statements: "Hearing aids make you appear inferior to others," "Two hearing aids make you look twice as hearing impaired," "I don't think a hearing aid would help me," and "I am afraid that I would not get the right hearing aid." The distribution of these responses is presented in Figures 4.6 through 4.9.

Social Perceptions

Statements that addressed social perceptions included: "My family is not supportive of my trying a hearing aid," "People I know with hearing aids are dissatisfied with them," and "Others have suggested that I try a hearing aid, but I don't think I need one."

Figures 4.10 and 4.11 illustrate the subjects' strong disagreement across questionnaires for the statements "Family members are not supportive of my trying a hearing

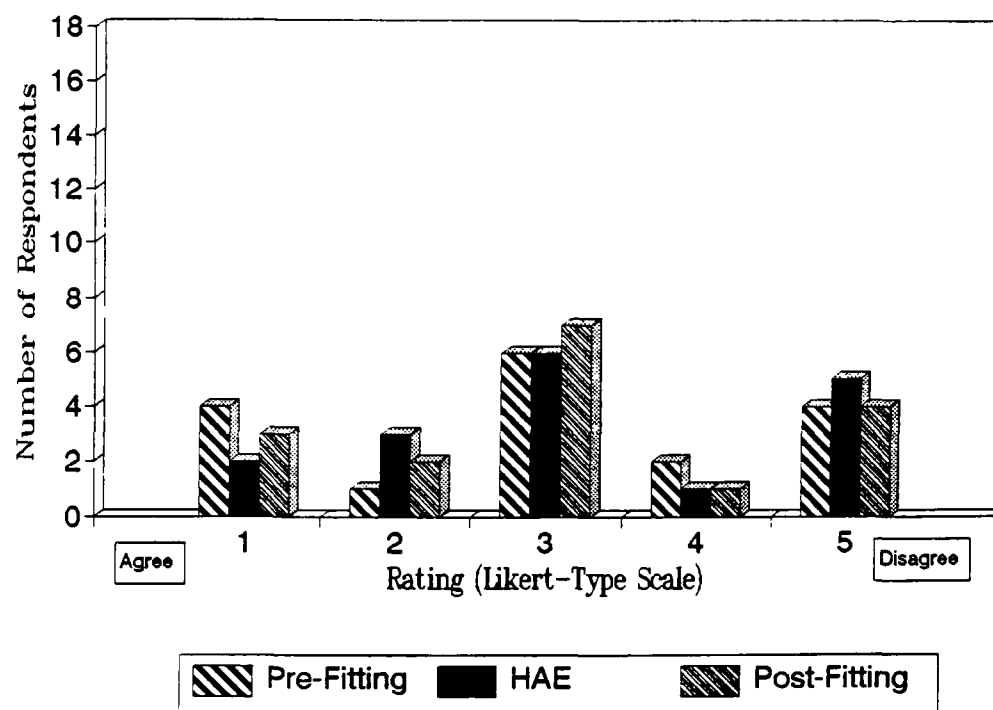


Figure 4.3. Distribution of responses to the statement "I would not want a hearing aid to be visible to others."

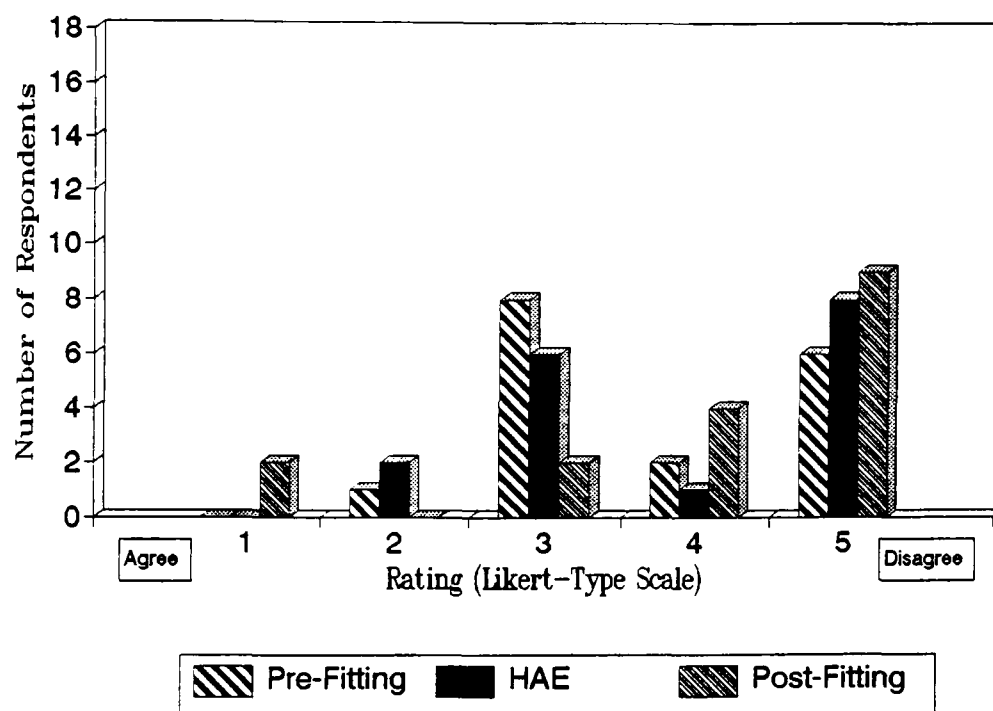


Figure 4.4. Distribution of responses to the statement "A hearing aid would make me nervous."

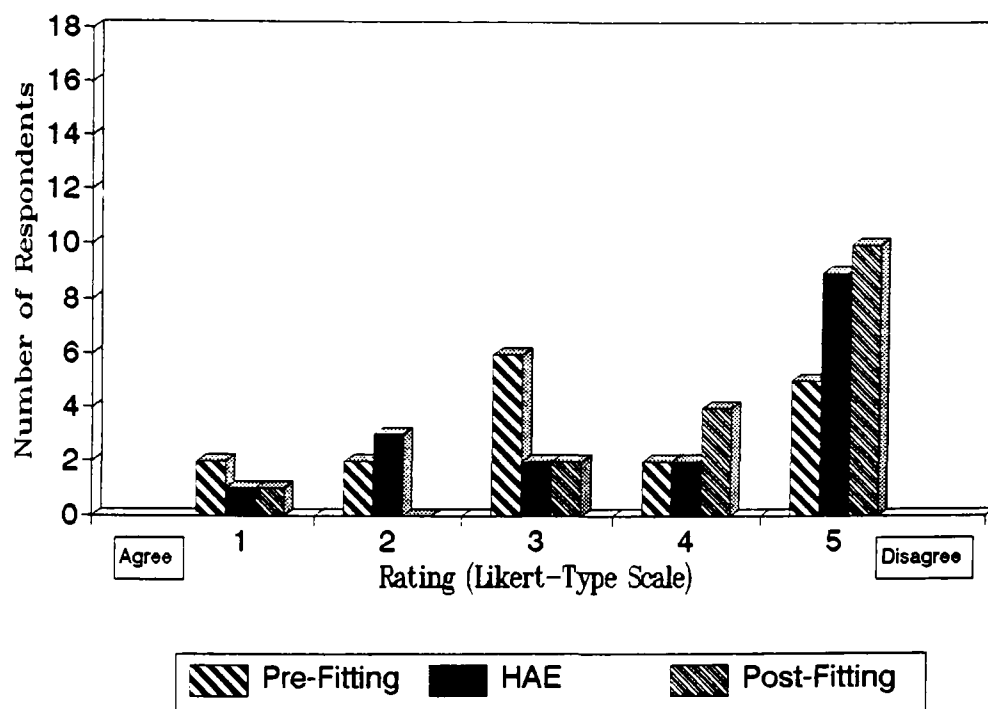


Figure 4.5. Distribution of responses to the statement "Hearing aids are a sign of aging."

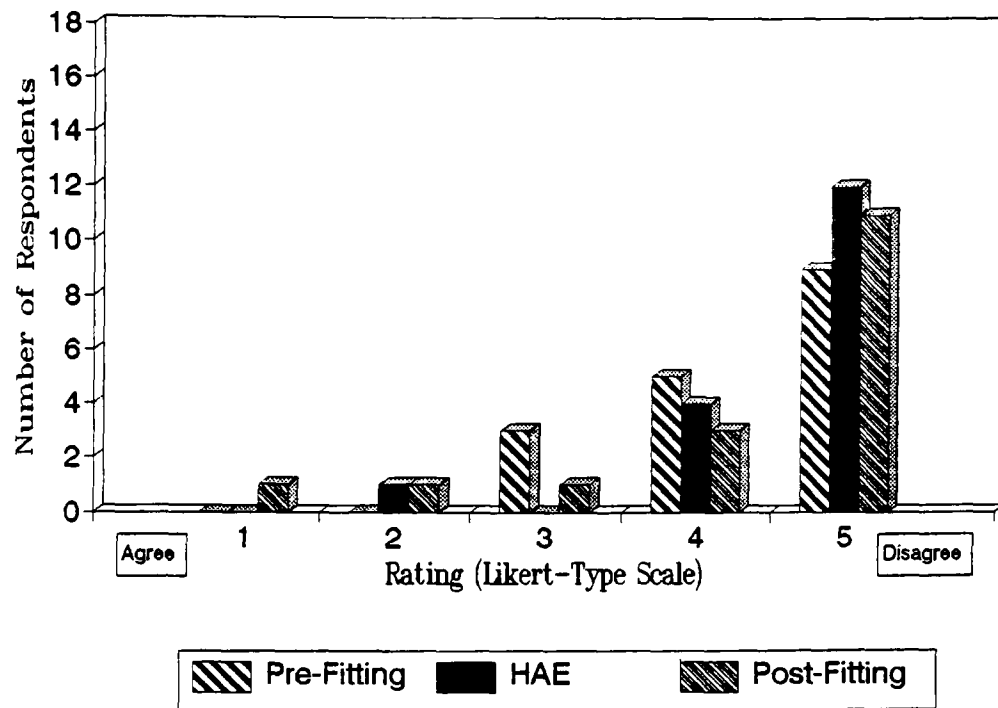


Figure 4.6. Distribution of responses to the statement "Hearing aids make you appear inferior to others."

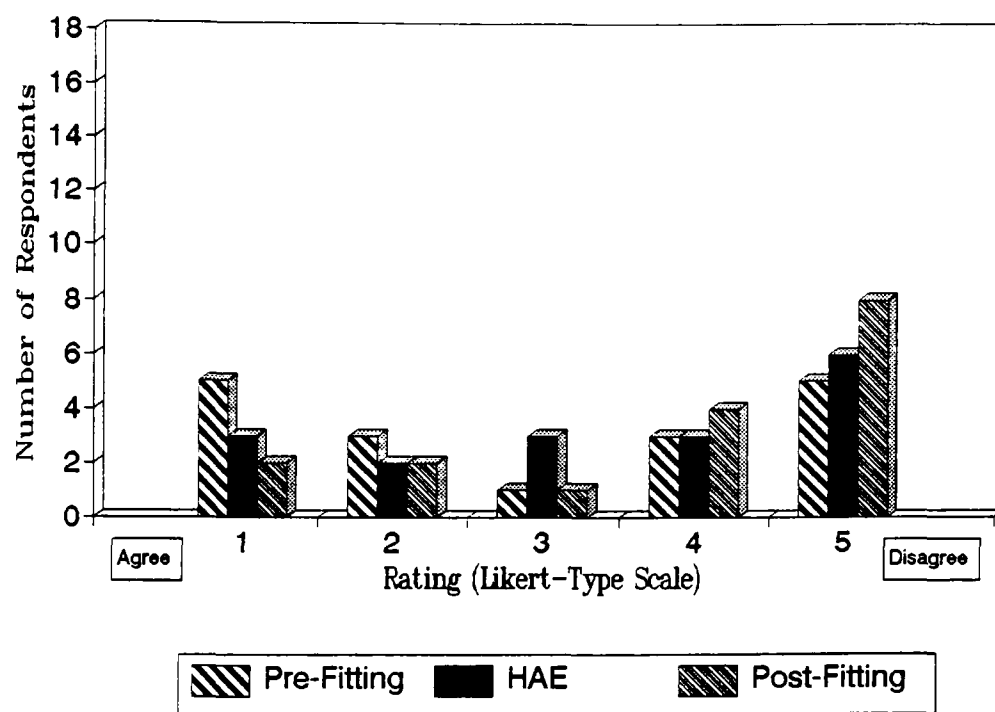


Figure 4.7. Distribution of responses to the statement "Two hearing aids make you look twice hearing impaired."

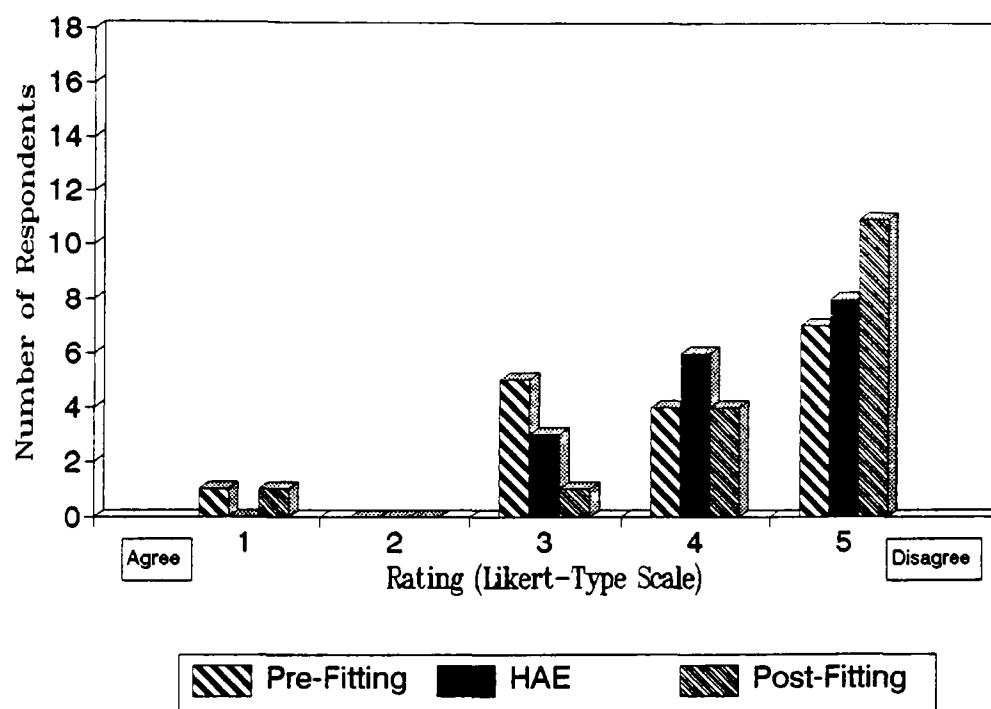


Figure 4.8. Distribution of responses to the statement "I don't think a hearing aid would help me."

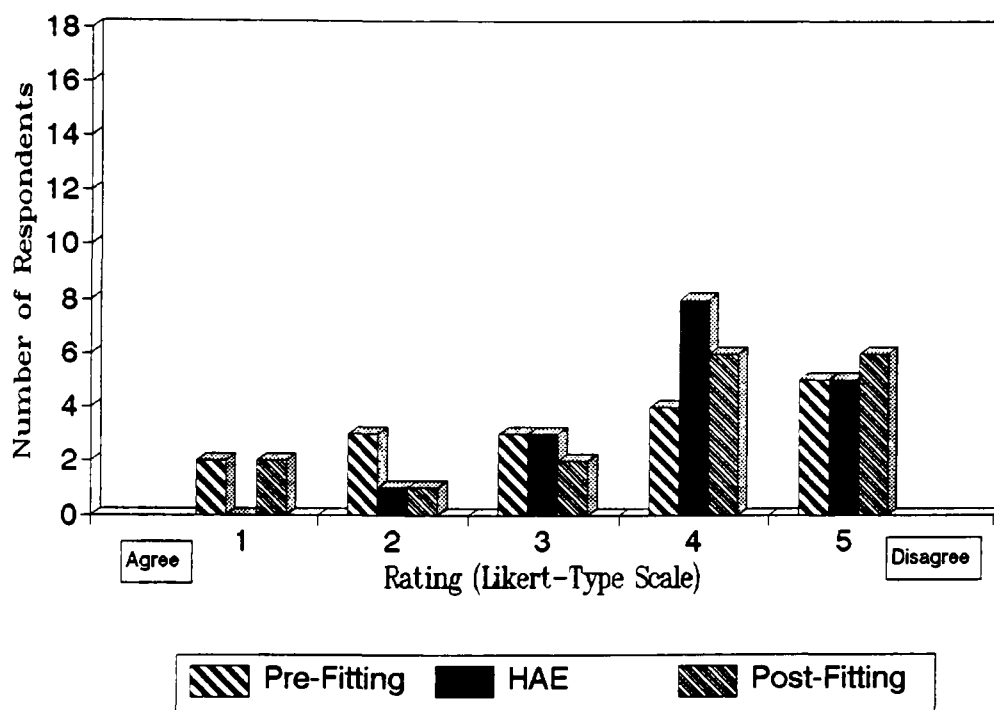


Figure 4.9. Distribution of responses to the statement "I am afraid that I would not get the right hearing aid."

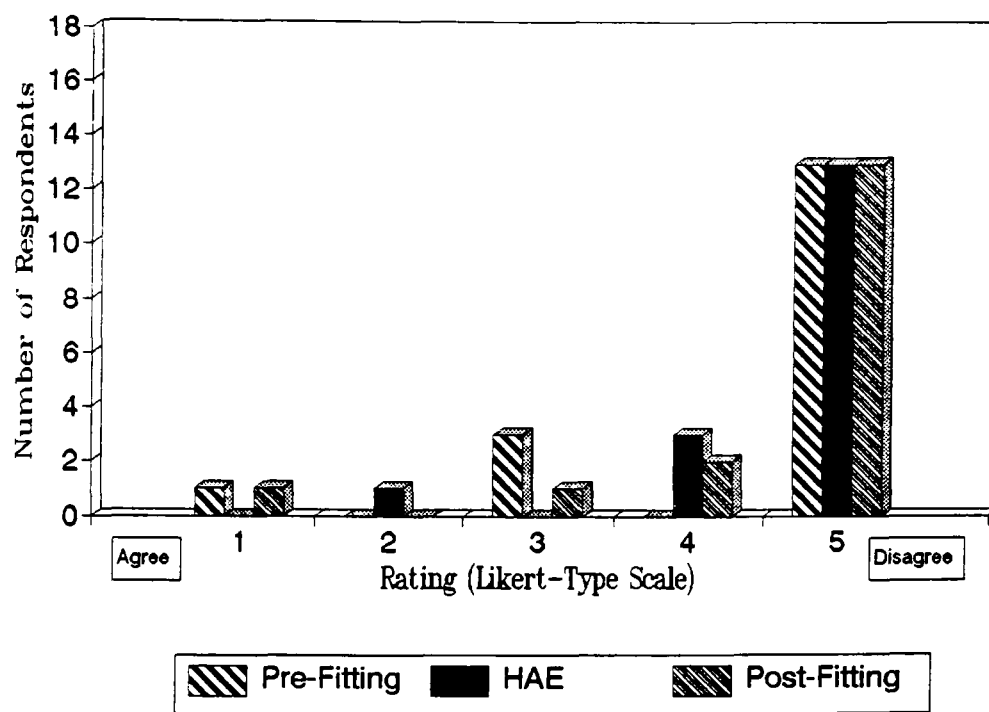


Figure 4.10. Distribution of responses to the statement "My family is not supportive of my trying a hearing aid."

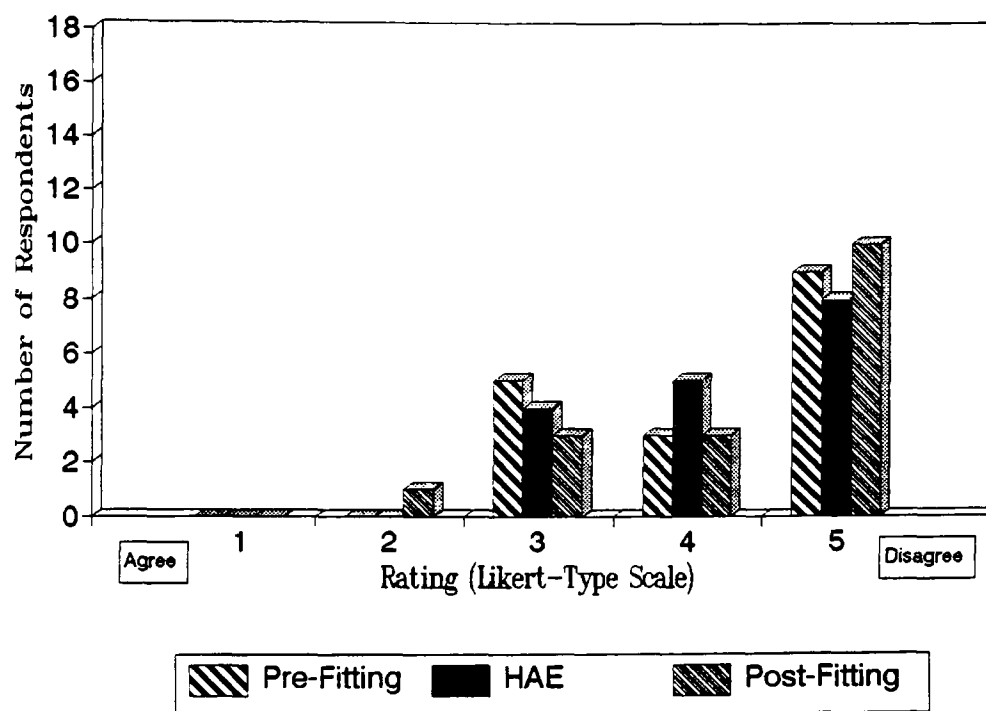


Figure 4.11. Distribution of responses to the statement "Others have suggested that I try a hearing aid, but I don't think I need one."

aid" and "Others have suggested that I try a hearing aid, but I don't think I need one." The responses were almost evenly divided for the statement "People I know with hearing aids are dissatisfied with them" and they did not change across the questionnaires as shown in Figure 4.12.

Spurious Perceptions

Statements included in this category are those that have no current basis in fact. They include: "Hearing aids are only for the most severe hearing losses," "Hearing aids should restore hearing to normal," "People with nerve deafness cannot use hearing aids," "People with hearing aids can tolerate more loudness than others," and "People can either hear normally or they are deaf."

Figure 4.13 illustrates the subjects' responses to the statement "Hearing aids are only for the most severe hearing losses." The number of subjects who disagreed with this statement increased with the administration of each successive questionnaire. Figure 4.14 illustrates the subjects' responses to the statement "Hearing aids should restore hearing to normal." Initially, the subjects agreed with or were neutral to this statement. However, on the fitting and post-fitting questionnaires, the responses became more scattered across the rankings. Figure 4.15 illustrates the subjects' responses to the statement "People with nerve deafness can't use hearing aids." Most subjects were neutral for this statement on the pre-fitting

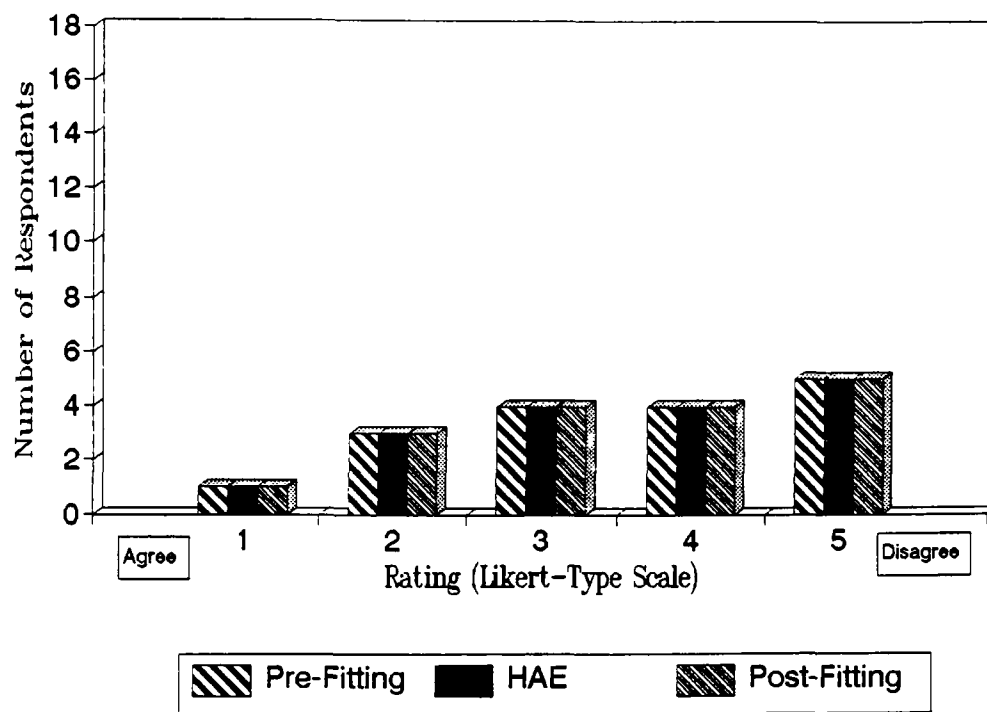


Figure 4.12. Distribution of responses to the statement "People I know with hearing aids are dissatisfied with them."

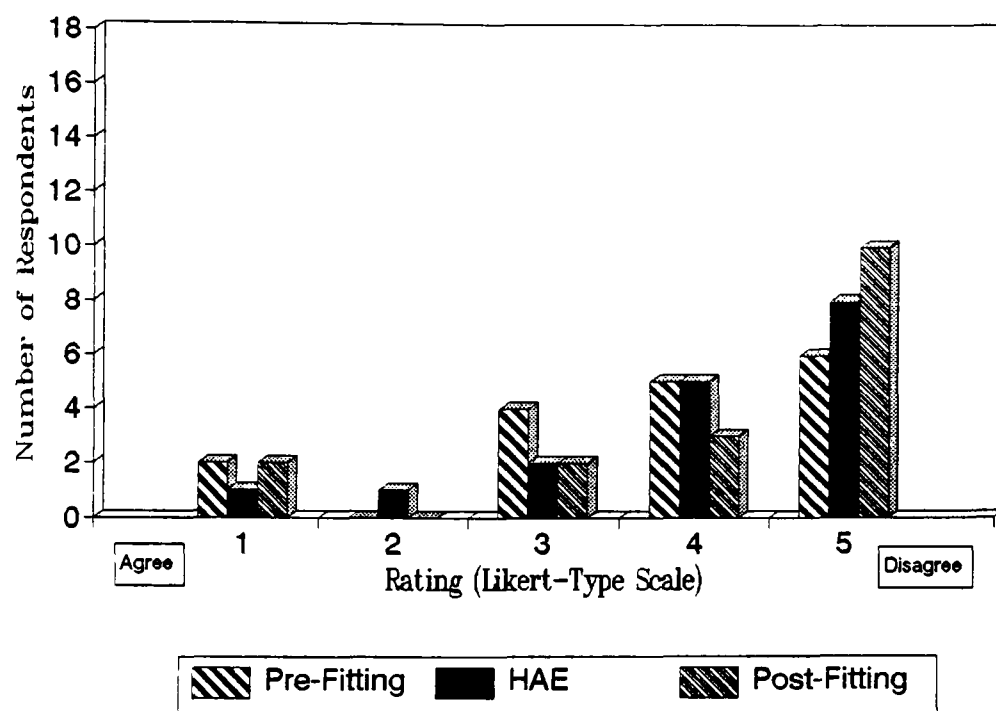


Figure 4.13. Distribution of responses to the statement "Hearing aids are only for the most severe hearing losses."

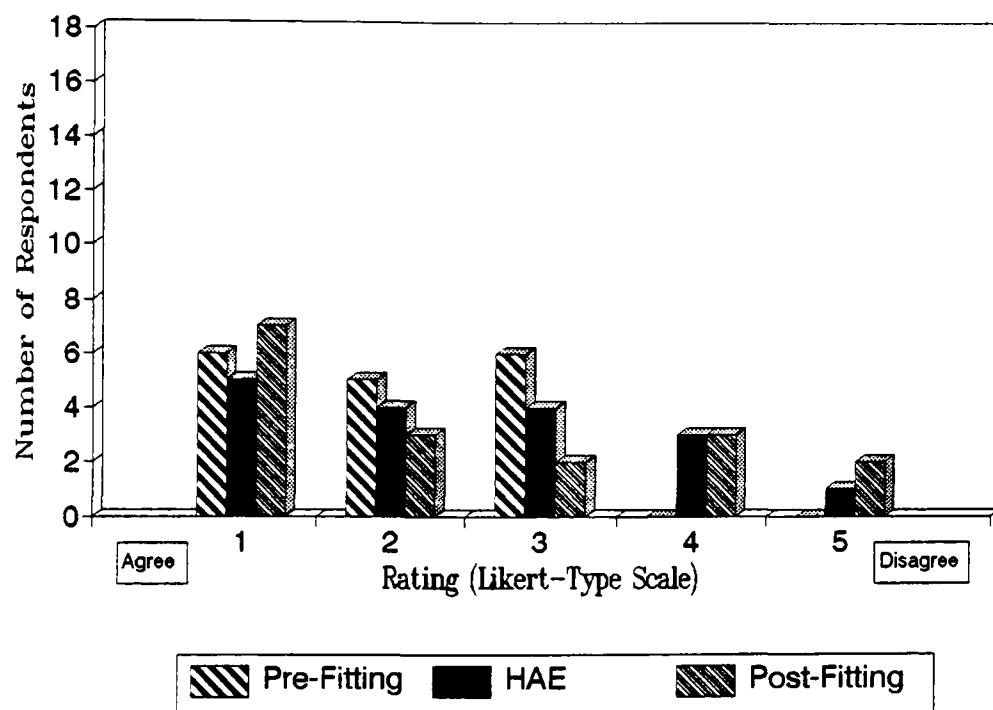


Figure 4.14. Distribution of responses to the statement "Hearing aids should restore hearing to normal."

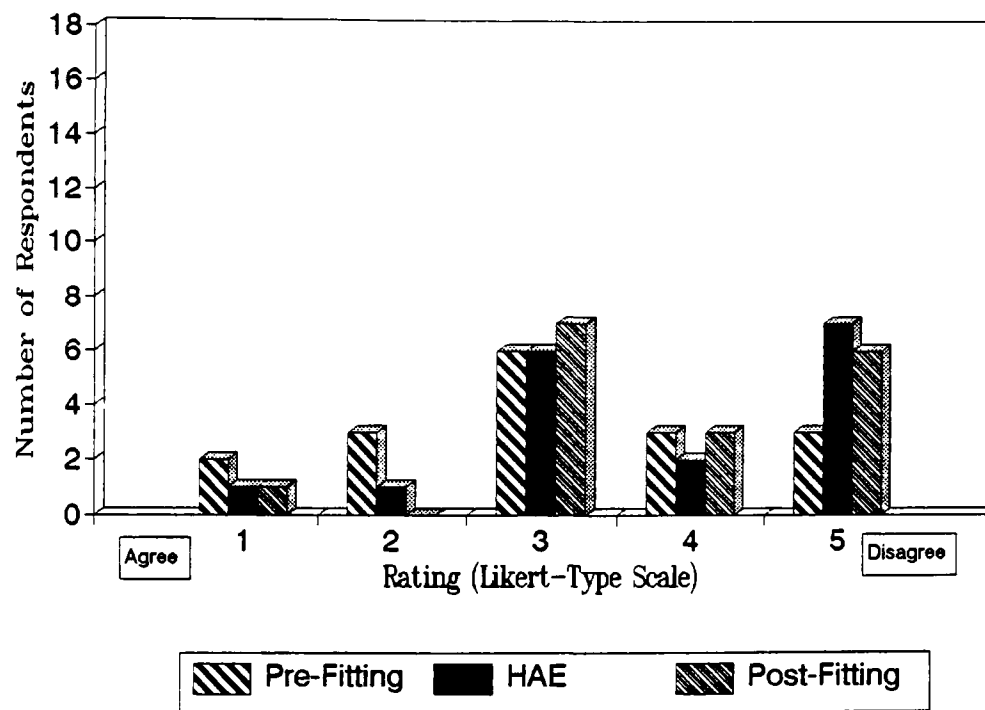


Figure 4.15. Distribution of responses to the statement "People with nerve deafness can't use hearing aids."

questionnaire. On the fitting and post-fitting questionnaires, a slight shift toward the subjects' disagreeing with this statement was observed. Figure 4.16 illustrates the subjects' responses to the statement, "People with hearing aids can tolerate more loudness than others." Most subjects either disagreed with or were neutral to this statement across all three questionnaires. Finally, Figure 4.17 illustrates subjects' responses to the statement "People can either hear normally or they are deaf." Most subjects disagreed with this statement across all three questionnaires."

External Perceptions

Statements included in this category were "The controls on hearing aids are difficult to adjust," "Hearing aids are overpriced," and "Hearing aids are uncomfortable to wear."

Figure 4.18 illustrates the subjects' responses to the statement "The controls on hearing aids are difficult to adjust." While most subjects were neutral to this statement on the pre-fitting questionnaire, on the fitting and post-fitting questionnaires, the subjects' responses shifted toward disagreement. Figure 4.19 illustrates the responses to the statement "Hearing aids are overpriced." On the fitting and pre-fitting questionnaires, the subjects were mostly neutral to or had agreed with this statement. On the post-fitting questionnaire, the subjects were almost evenly divided across all five rankings. Figure 4.20 illustrates

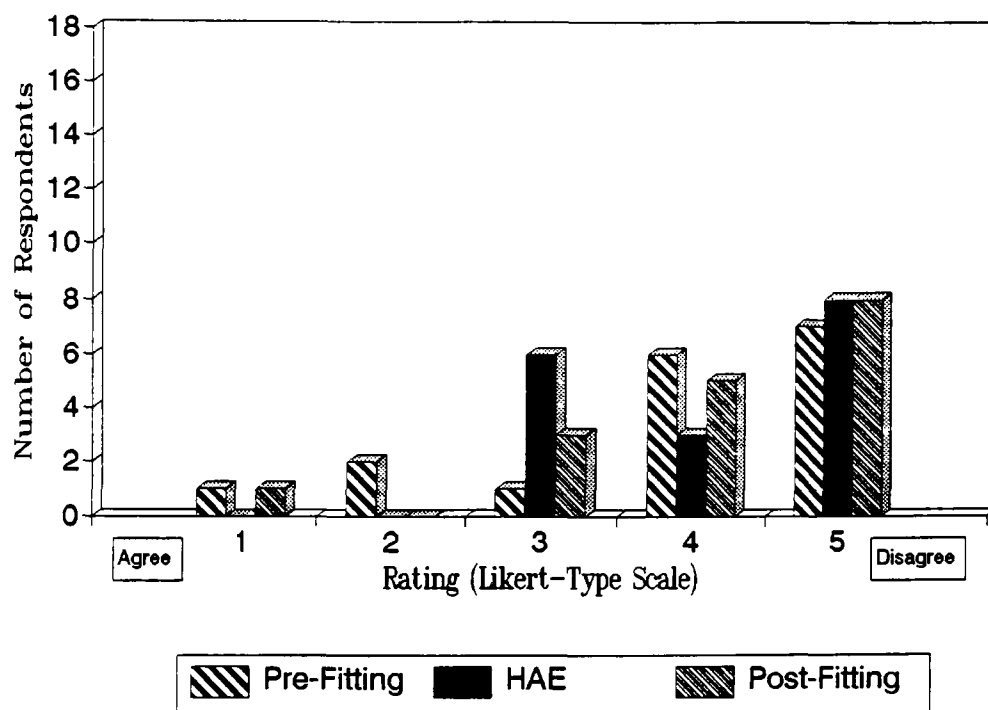


Figure 4.16. Distribution of responses to the statement "People with hearing aids can tolerate more loudness than others."

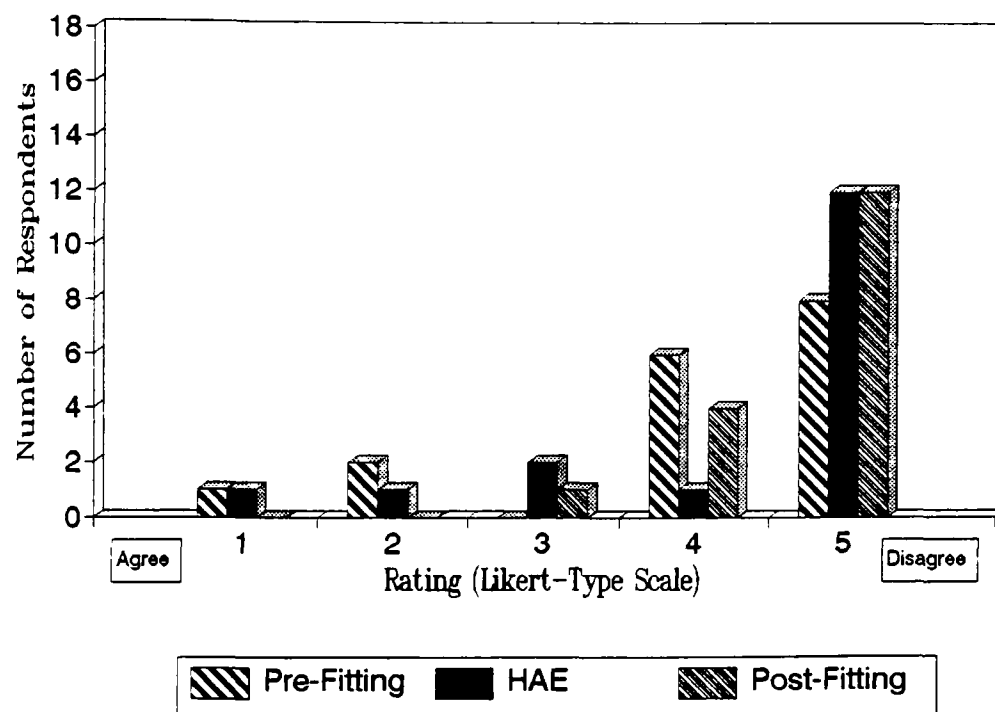


Figure 4.17. Distribution of responses to the statement "People can either hearing normally, or they are deaf."

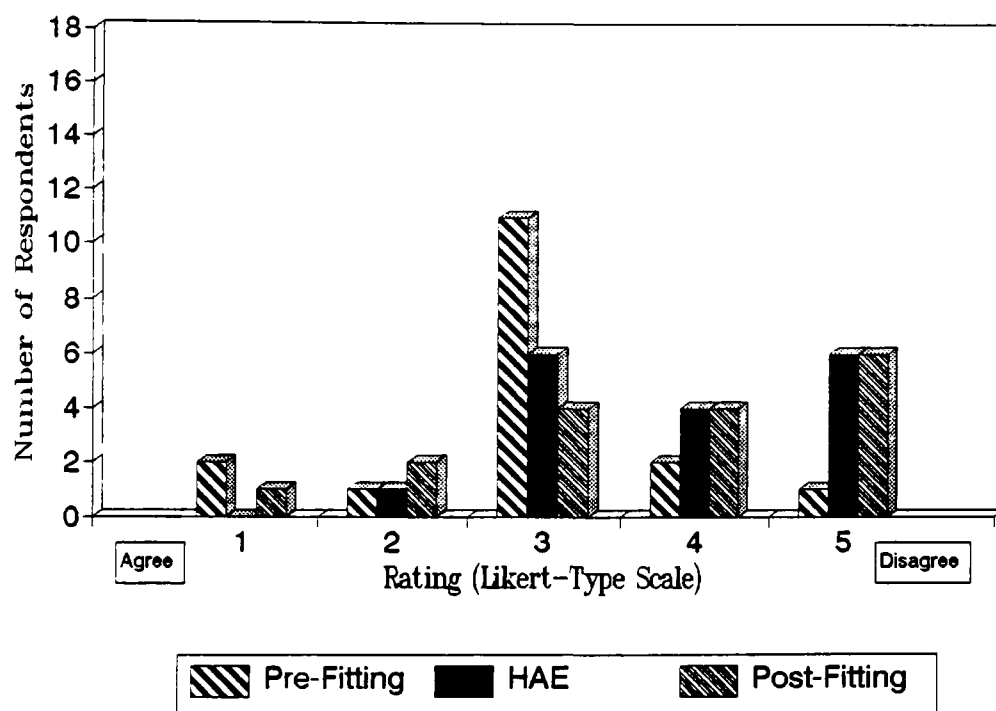


Figure 4.18. Distribution of responses to the statement "The controls on hearing aids are difficult to adjust."

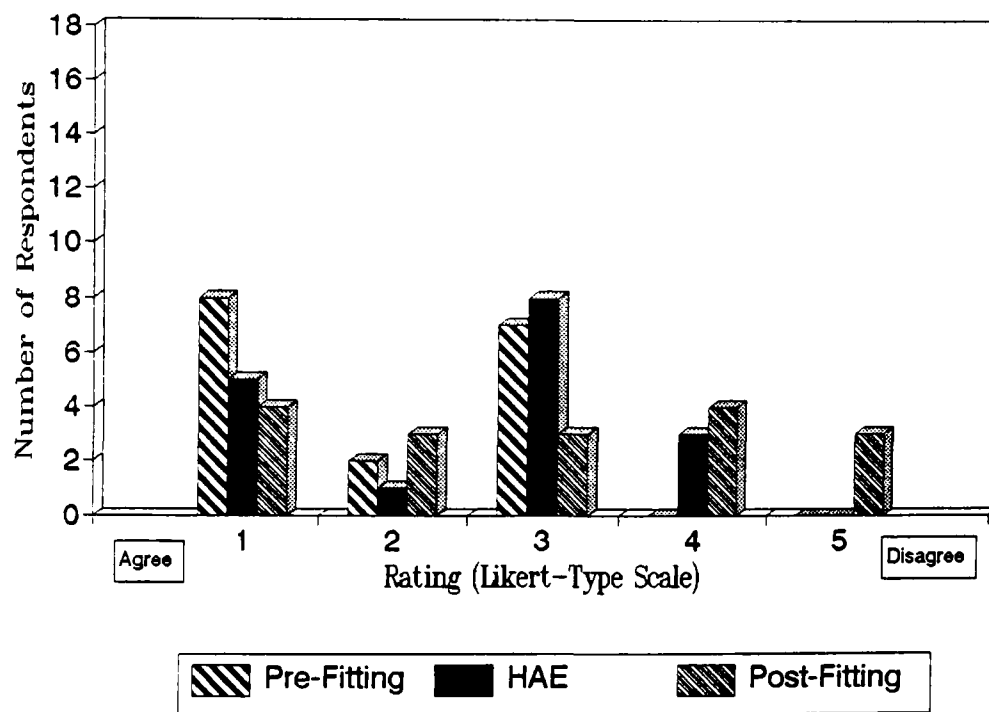


Figure 4.19. Distribution of responses to the statement "Hearing aids are overpriced."

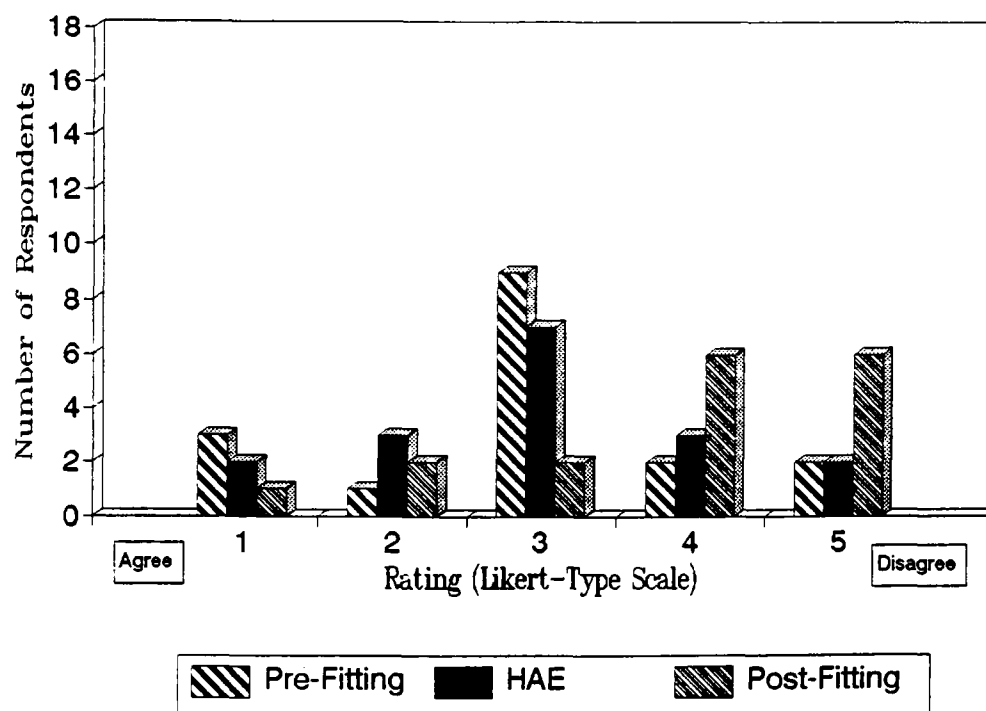


Figure 4.20. Distribution of responses to the statement "Hearing aids are uncomfortable to wear."

the subjects' responses to the statement "Hearing aids are uncomfortable to wear." On the pre-fitting and fitting questionnaires, most subjects were neutral to this statement. On the post-fitting questionnaire, the subjects generally disagreed with this statement.

Service-oriented Perceptions

The statements under the service-oriented category appeared only on the fitting and post-fitting questionnaires. These statements included: "The audiologist adequately explained my hearing loss to me," "I would refer others to this office/ clinic," "The audiologist adequately explained the use of the hearing aid to me," and "A 30 day trial is sufficient to determine whether or not to keep a hearing aid." For each of these statements, there were never more than three respondents who selected a rating other than 'strongly agree.' The distributions of the subjects' responses for these statements are presented in Figures 4.21 through 4.24.

Use and Satisfaction

Two statements addressed the subjects' use of and satisfaction with the hearing aids. They were "During the trial period, I wore the hearing aid most of the time," and "I am not satisfied with the hearing aid." These statements appeared only on the final questionnaire. Figures 4.25 and 4.26 illustrate the responses to these statements. Most subjects indicated that they wore their hearing aids most of the time and that they were satisfied with the hearing aid.

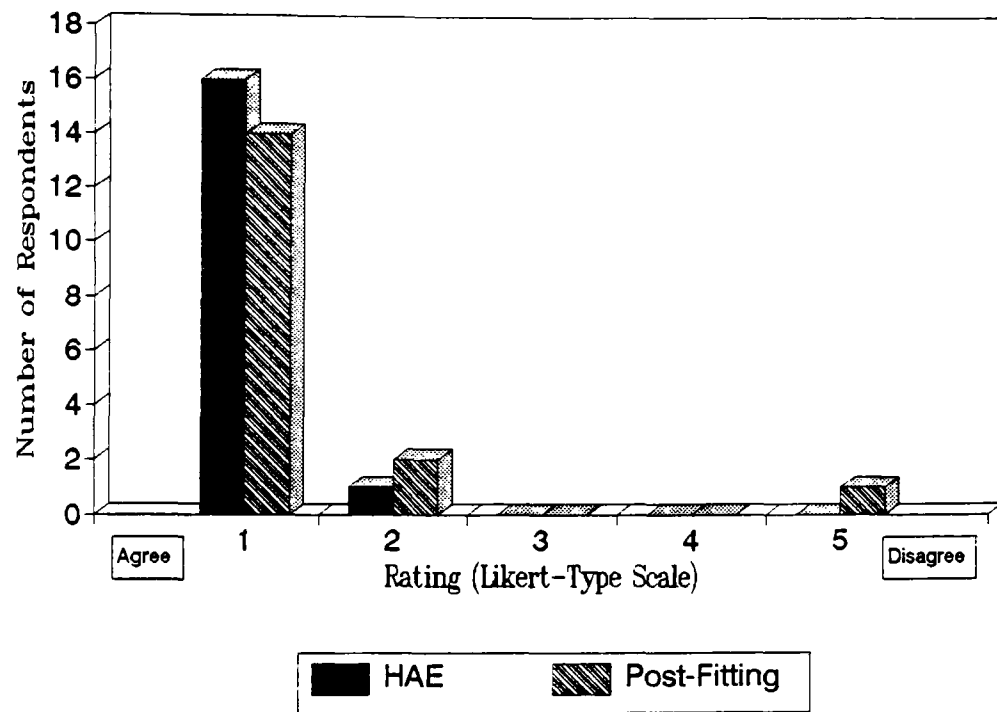


Figure 4.21. Distribution of responses to the statement "The audiologist adequately explained my hearing loss to me."

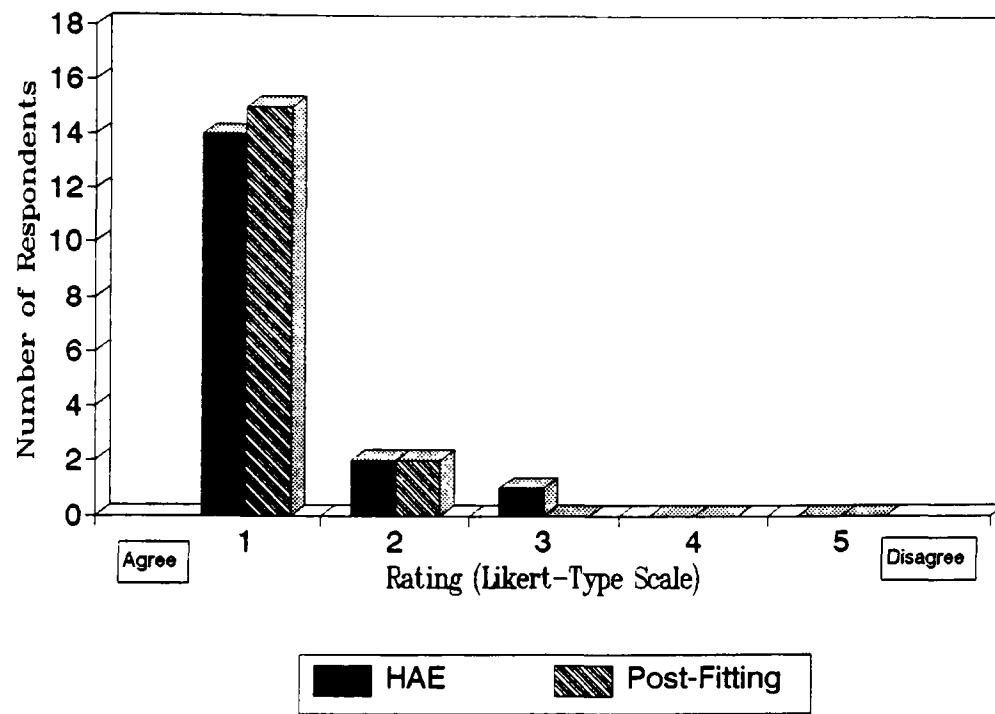


Figure 4.22. Distribution of responses to the statement "I would refer others to this office/clinic."

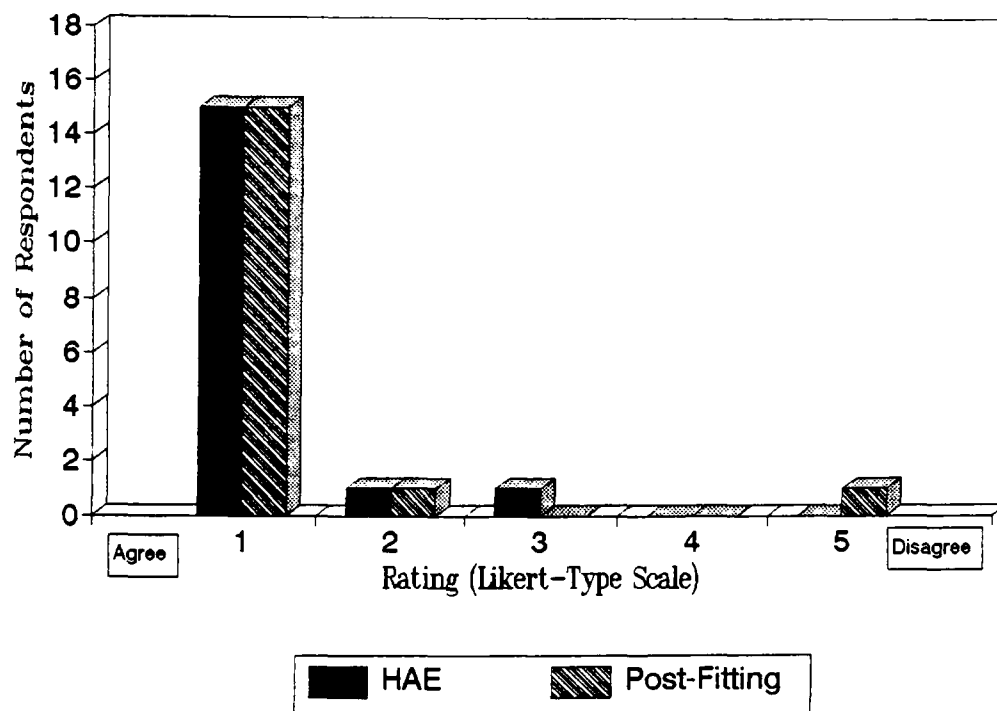


Figure 4.23. Distribution of responses to the statement "The audiologist adequately explained the use of the hearing aid to me."

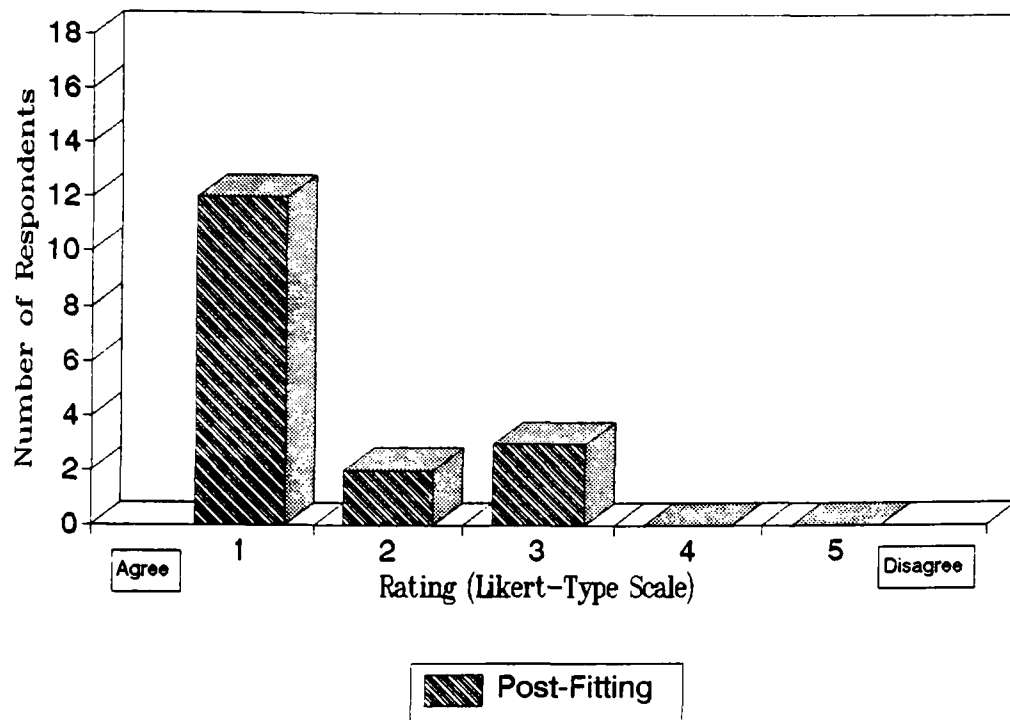


Figure 4.24. Distribution of responses to the statement "The thirty day trial is sufficient to determine whether or not to keep a hearing aid."

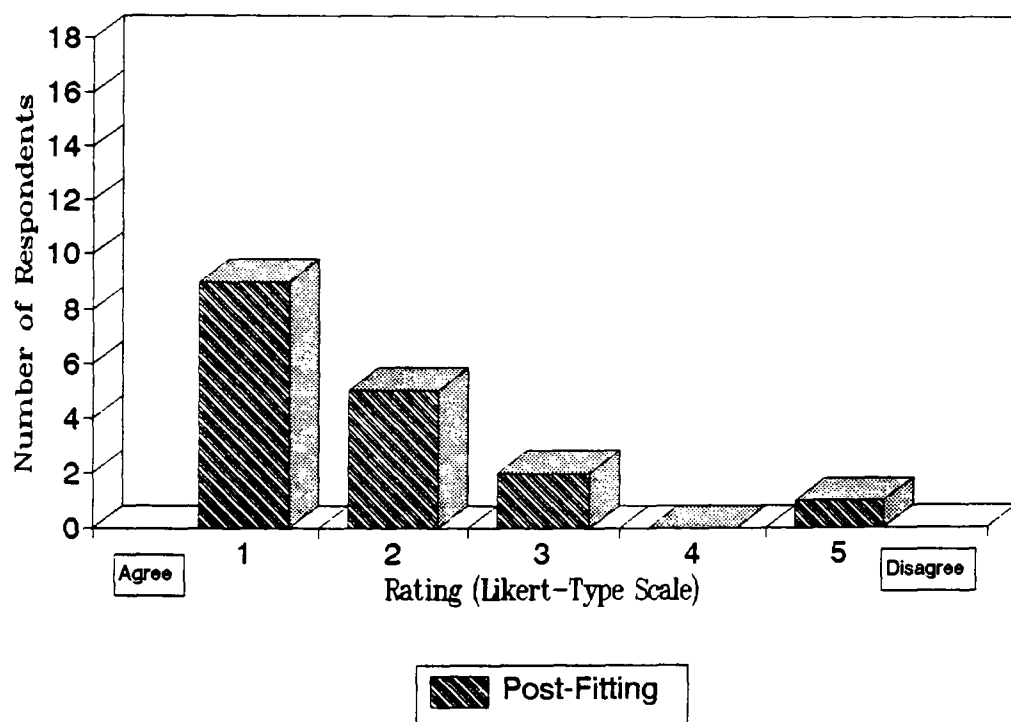


Figure 4.25. Distribution of responses to the statement "During the trial period, I wore the hearing aid most of the time."

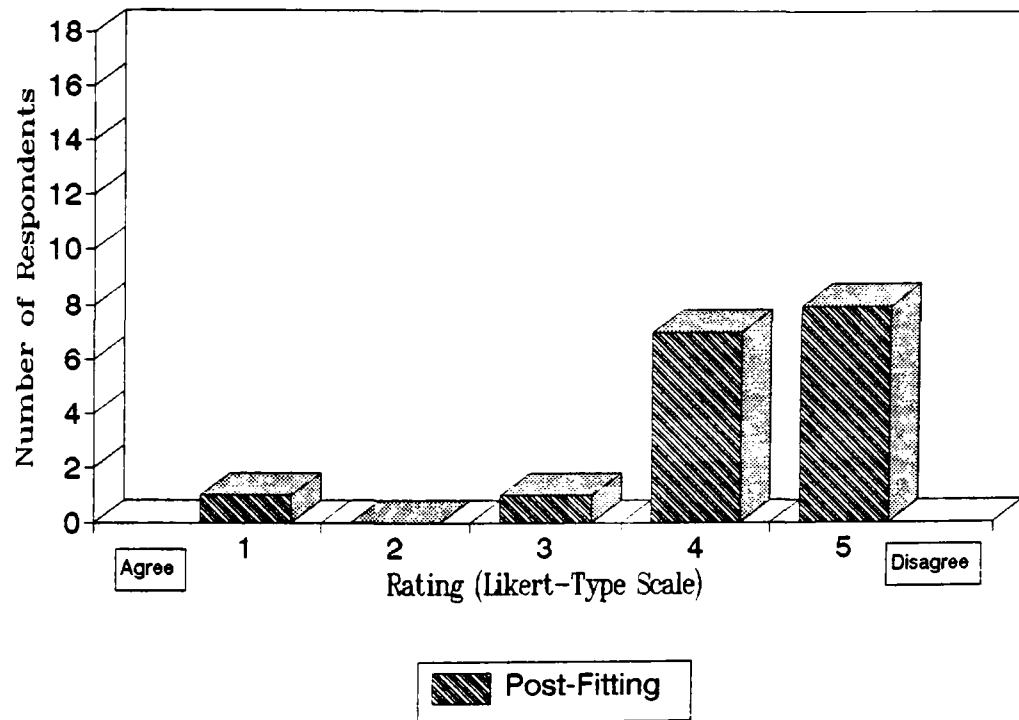


Figure 4.26. Distribution of responses to the statement "I am not satisfied with the hearing aid."

CHAPTER 5: DISCUSSION

The low number of complete sets of questionnaires returned to the examiner precludes extensive generalization about the results of this study. However, the data which was collected implied that there was relatively little shift in the attitudes of new hearing aid users from the time of their initial testing until their completion of a thirty day trial with their hearing aid(s). Therefore, the results of this study suggest:

- 1) the subjects had few misconceptions prior to trying a hearing aid,
- 2) the subjects' opinions about hearing aids were not strongly altered by any procedure or discussion that occurred during the fitting appointment, and
- 3) the subjects maintained generally positive attitudes throughout a 30 day trial period.

These results are largely inconsistent with expectations prior to the data collection: that the subjects would express more misconceptions on the pre-fitting questionnaire, that the misconceptions would largely be resolved during the fitting and trial period, and finally, that genuine difficulties with hearing aids would emerge on the post-fitting questionnaire. The pertinent question then becomes whether the current study provides an accurate representation of the experience of the general population of new hearing aid users.

It is noteworthy that the largely positive results of this study are consistent with the results the of previous studies cited in this paper. Franks and Beckman (1985) noted mostly positive responses from people who kept their hearing aids and Pou et al. (1981) also showed a strong positive response from the patients fit at their clinic. In addition, as not one of the subjects who completed all three of their questionnaires returned their hearing aids, the attitudes of hearing-impaired adults who reject amplification were not assessed. Therefore, any information regarding the reasons for client rejection of a hearing aid was not available.

The overall satisfaction of the subjects may be partially attributed to the criteria used for subject selection. First, any client who failed to meet the pure tone average requirement was excluded from the study. Wernick (1985) indicated that people whose hearing loss lies on either extreme of the audiogram tend to be poorer candidates for successful hearing aid use. Second, as all subjects were fit a limited sample of audiologists, the nature and qualifications of the dispenser may have influenced the results. This is consistent with Oja and Schow's report (1984) that people fit by audiologists generally are more satisfied than others may be relevant to the interpretation of the present study since all of the subjects were fit by audiologists. Third, potential

subjects were excluded if their hearing aid payment was provided by a third party payer. The rationale for this criterion was that the individuals not personally responsible for their own hearing aid payment might be less concerned with how well the hearing aid performs and therefore could significantly confound the reliability and validity of the study. Finally, persons less than 50 years of age were excluded in an effort to confine the survey to the population with the greatest number of hearing aid users.

The results of this study did not strongly support the Franks and Beckman (1985) conclusion that expense is an important issue to hearing aid users. Although the pre-fitting mean response to the statement "Hearing aids are overpriced" indicated that the subjects generally agreed with this statement, the mean response shifted toward a general disagreement on the post-fitting questionnaire. Therefore, with time, the subjects became less concerned about cost. This data suggests that as the subjects adjusted to using their hearing aid(s), they felt more dependent on it and it became more valuable to them. Additional factors to consider regarding the subjects' perception of cost include the wide variation in hearing aid prices, the geographical location of the dispenser, and dealer versus audiologist as the dispenser of the hearing aid.

The response means for the statement "I would not want a hearing aid to be visible to others" indicated general neutrality for each of the three questionnaires. This also contrasts with the findings of Franks and Beckman (1985) as well as the focus of the hearing aid industry whose efforts have been directed toward increased miniaturization during recent history. Perhaps the audiologists who participated in the study tended not to fit those clients whose primary concern was cosmetic. In addition, the subjects may have been hesitant to admit to any vanity in the survey. Finally, the low number of subjects places obvious restrictions on the degree to which the results can be generalized.

Response Rate

The limited participation of the audiologists was perhaps the greatest obstacle to the study's completion. The question must be addressed as to why so few of the audiologists who had consented to participate actually did so.

The limited participation may be partially due to the manner in which the study was executed. For instance, the instructions to the audiologists specified that the receptionists should distribute the questionnaires. The objective was to minimize the time involvement of the audiologists as well as the possibility of the audiologists contaminating the subjects' responses. However, any effects

from the use of support personnel may have been difficult to quantify for several reasons. First, the level of each receptionist's motivation to distribute the questionnaires is not known. Second, the receptionists may have found it difficult to judge which clients were appropriate to include in the study due to a lack of specific information on each client. Third, the sheer amount of paper involved could have intimidated the receptionists. The three questionnaires per client may have given the impression of more work than seemed warranted considering that there was no additional compensation for it.

In spite of the aforementioned possibilities, the fact remains that had audiologist participation been stronger, more data would have been obtained. Clearly, this study did not offer adequate motivation for the audiologists involved. Most of the participating audiologists did not know the author well and therefore did not feel a personal commitment to the study. Furthermore, the offer to share the study's findings may not have served as sufficient enticement for their participation. Their uncertainty as to how the data would be used may have also contributed to the audiologists' lack of participation. Finally, while monetary reimbursement was not an alternative that was ever pursued during this study, financial reimbursement might have increased the response rate of the survey.

The limited participation by the audiologists was not the only difficulty encountered in the study. Many of the subjects did not complete all three parts of the survey which compromised the usefulness of the completed questionnaires. This may be related to the lack of interest shown by the audiologists. In other words, if there was no impetus from the audiologists to be certain that each questionnaire was completed, it is possible that not all parts of the survey were actually delivered to each subject. The lack of subject response may also be related to the nature of the hearing aid business. People involved in the sale of hearing aids are often associated with hard-sell tactics. Many senior citizens are familiar with the home telephone solicitations of hearing aid salesmen or know someone who has been sold a hearing aid in this manner. Although every effort was made to reassure subjects of the confidentiality of the study, they may have been wary of being contacted directly and were therefore reluctant to participate. Finally, the subjects may have been concerned about their audiologist having access to the surveys. The subjects may have been uneasy that the relationship with the audiologist would have been negatively affected if the audiologist was given access to the questionnaires. This may also have accounted for some of the homogeneity of response across the three questionnaires.

Suggested Modifications

The basic issue which must be addressed is how the methodology could be modified to improve audiologist participation and the subject response rate. Obviously, the subject selection criteria could be relaxed in order to permit more persons to participate in the survey. Allowing persons with a milder degree of hearing loss could have increased the number of subjects. However, there is some question as to whether many audiologists would fit persons with extremely mild hearing losses. Omitting the restriction of third party payments would have meant allowing those clients who are dependent on Medicaid or other third party agents that provide hearing aid coverage. Although the number of subjects would have been increased by the inclusion of these clients, the degree to which the results could have been generalized might have been compromised due to the possibility of lesser interest as described in the previous chapter. The omission of the age limitation would also have increased the number of potential subjects, but again, could have negatively affected the results as it would have meant inclusion of a group of hearing aid users with possibly different beliefs and value systems due to generational differences.

Following the completion of the study, probes of the audiologists revealed that they became reluctant to continue the questionnaire distribution when their clients reacted

negatively to completing yet another questionnaire.

Clearly, the three questionnaires per subject was considered too demanding by many potential subjects. Studies such as the present one might best be achieved by incorporating ideas of the participating audiologists into their execution.

The provision of a monetary incentive to the audiologists must be considered as a means of improving the survey return rate. If each audiologist was offered reimbursement for a specific number of complete sets of questionnaires, the chances of increasing the number of participating subjects would be greatly enhanced. The advantage of this tactic is that the original criteria for subject selection could be maintained. The disadvantage is that it puts more responsibility on the audiologist, resulting in more contact and handling of the questionnaires by the audiologist and the increased possibility of contamination of the subject data. There would also be a stronger need for subject identification and confirmation to eliminate the possibility of forged responses.

Further Research

Clearly, this study should be repeated using a much larger sample size of subjects in order to validate the preliminary results described earlier. The aforementioned modifications could be pursued to this end. The additional studies also could address other pertinent issues regarding

hearing aid users' satisfaction.

A survey of hearing aid users who have worn hearing aids for a period longer than a year could be compared to the results of the current study. Information as to whether the beliefs and perceptions of hearing aid users remain stable over time could then be obtained. A study of this nature could enlighten hearing aid dispensers about which user issues are the most pertinent over time.

In light of the literature cited above which notes greater dissatisfaction by those persons fit by hearing aid dealers, research into the differences between the hearing aid fittings of audiologists and hearing aid dealers seems warranted. Insight into the various aspects of hearing aid evaluations and fittings as they are performed across and within dispenser groups could be provided. Ultimately, those factors which are the most germane to user dissatisfaction as they relate to the dispenser should become apparent.

Finally, additional research into hearing aid rejection is needed. A survey of people who have rejected amplification in the past could provide helpful insight by illuminating the specific elements relevant to hearing aid rejection. This, in turn, could aid the dispenser in knowing which issues he or she should address during hearing aid fittings.

Summary

The present study attempted to determine if and how the attitudes of new hearing aid users changed from the initial testing to the end of a 30 day trial period with the subjects' hearing aid(s). Questionnaires were devised and administered prior to an audiological evaluation, at the time of a hearing aid fitting, and following a 30 day trial with a hearing aid(s). Seventeen subjects returned a complete set of three questionnaires. The results indicated that the subjects attitudes about and conceptions of hearing aids were largely positive and showed relatively little change over time. The small sample size of complete sets of questionnaires limited the application and generalization of the study's results.

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APPENDIX A

Pre-fitting Questionnaire

The following statements refer to how people may feel about hearing aids. Each of the items can be rated on a scale of one to five. One means "strongly agree" and five means strongly disagree. Please circle the number which best describes the way you feel about each statement. It is important that you respond to each statement with only one choice. There are no right or wrong answers. Please indicate your opinion as closely as possible.

- | | | | | | |
|---|---|---|---|---|---|
| 1. A hearing aid is helpful for understanding speech in the presence of most types of background noise. | 1 | 2 | 3 | 4 | 5 |
| 2. The controls on hearing aids are difficult to adjust. | 1 | 2 | 3 | 4 | 5 |
| 3. Hearing aids are overpriced. | 1 | 2 | 3 | 4 | 5 |
| 4. Family members are not supportive of my trying a hearing aid. | 1 | 2 | 3 | 4 | 5 |
| 5. I wouldn't want a hearing aid to be visible to others. | 1 | 2 | 3 | 4 | 5 |
| 6. Hearing aids make sounds too loud. | 1 | 2 | 3 | 4 | 5 |
| 7. Hearing aids are uncomfortable to wear. | 1 | 2 | 3 | 4 | 5 |
| 8. Hearing aids are only for the most severe hearing losses. | 1 | 2 | 3 | 4 | 5 |
| 9. People I know with hearing aids are dissatisfied with them. | 1 | 2 | 3 | 4 | 5 |
| 10. Hearing aids should restore hearing to normal. | 1 | 2 | 3 | 4 | 5 |
| 11. A hearing aid would make me nervous. | 1 | 2 | 3 | 4 | 5 |
| 12. Hearing aids are a sign of aging. | 1 | 2 | 3 | 4 | 5 |
| 13. A hearing aid makes you appear inferior to others. | 1 | 2 | 3 | 4 | 5 |
| 14. People with nerve deafness can't use hearing aids. | 1 | 2 | 3 | 4 | 5 |
| 15. Two hearing aids make you look twice as hearing-impaired. | 1 | 2 | 3 | 4 | 5 |

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|---|---|---|---|---|---|
| 16. People with hearing aids can tolerate more loudness than others. | 1 | 2 | 3 | 4 | 5 |
| 17. People can either hear normally or they are deaf. | 1 | 2 | 3 | 4 | 5 |
| 18. I don't think a hearing aid would help me. | 1 | 2 | 3 | 4 | 5 |
| 19. Others have suggested that I try a hearing aid, but I don't think I need one. | 1 | 2 | 3 | 4 | 5 |
| 20. I am afraid that I would not get the right hearing aid. | 1 | 2 | 3 | 4 | 5 |

APPENDIX B

FITTING QUESTIONNAIRE

The following statements refer to how people may feel about hearing aids. Each of the items can be rated on a scale of one to five. One means "strongly agree" and five means "strongly disagree." Please circle the number which best describes the way you feel about each statement. It is important that you respond to each statement with only one choice. There are no right or wrong answers. Please indicate your opinion as closely as possible.

- | | | | | | |
|---|---|---|---|---|---|
| 1. My hearing loss was adequately explained to me by the audiologist. | 1 | 2 | 3 | 4 | 5 |
| 2. A hearing aid is helpful for understanding speech in the presence of most types of background noise. | 1 | 2 | 3 | 4 | 5 |
| 3. I am afraid that I would not get the right hearing aid. | 1 | 2 | 3 | 4 | 5 |
| 4. The controls on hearing aids are difficult to adjust. | 1 | 2 | 3 | 4 | 5 |
| 5. Others have suggested that I try a hearing aid, but I don't think I need one. | 1 | 2 | 3 | 4 | 5 |
| 6. I would refer others to this clinic/office for hearing aid services. | 1 | 2 | 3 | 4 | 5 |
| 7. Hearing aids are overpriced. | 1 | 2 | 3 | 4 | 5 |
| 8. I don't think a hearing aid would help me. | 1 | 2 | 3 | 4 | 5 |
| 9. Family members are not supportive of my trying a hearing aid. | 1 | 2 | 3 | 4 | 5 |
| 10. People can either hear normally or are deaf. | 1 | 2 | 3 | 4 | 5 |
| 11. The use of the hearing aid was fully explained to me by the audiologist. | 1 | 2 | 3 | 4 | 5 |
| 12. I wouldn't want a hearing aid to be visible to others. | 1 | 2 | 3 | 4 | 5 |
| 13. People with hearing aids can tolerate more loudness than others. | 1 | 2 | 3 | 4 | 5 |
| 14. Hearing aids make sounds too loud. | 1 | 2 | 3 | 4 | 5 |

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|---|---|---|---|---|---|
| 15. Two hearing aids make you look twice as hearing impaired. | 1 | 2 | 3 | 4 | 5 |
| 16. Hearing aids are uncomfortable to wear. | 1 | 2 | 3 | 4 | 5 |
| 17. People with nerve deafness can't use hearing aids. | 1 | 2 | 3 | 4 | 5 |
| 18. Hearing aids are only for the most severe hearing losses. | 1 | 2 | 3 | 4 | 5 |
| 19. A hearing aid makes you appear inferior to others. | 1 | 2 | 3 | 4 | 5 |
| 20. Hearing aids should restore hearing to normal. | 1 | 2 | 3 | 4 | 5 |
| 21. Hearing aids are a sign of aging. | 1 | 2 | 3 | 4 | 5 |
| 22. A hearing aid would make me nervous. | 1 | 2 | 3 | 4 | 5 |
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APPENDIX C

POST-FITTING QUESTIONNAIRE

The following statements refer to how people may feel about hearing aids and their use. Each of the items can be rated on a scale of one to five. One means "strongly agree" and five means "strongly disagree." Please circle the number which best describes the way you feel about each statement. It is important that you respond to each statement with only one choice. There are no right or wrong answers. Please indicate your opinion as honestly as possible.

Are you keeping the hearing aid? Please circle one. yes no

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|---|---|---|---|---|---|
| 1. During the trial period, I wore the hearing aid most of the time. | 1 | 2 | 3 | 4 | 5 |
| 2. My hearing loss was adequately explained to me by the audiologist. | 1 | 2 | 3 | 4 | 5 |
| 3. A thirty day trial period is a sufficient amount of time to determine whether to keep a hearing aid. | 1 | 2 | 3 | 4 | 5 |
| 4. Hearing aids are helpful for understanding speech in background noise. | 1 | 2 | 3 | 4 | 5 |
| 5. I would refer others to this clinic/office for hearing aid services. | 1 | 2 | 3 | 4 | 5 |
| 6. The use of the hearing aid was fully explained to me by the audiologist. | 1 | 2 | 3 | 4 | 5 |
| 7. The hearing aid controls are difficult to adjust. | 1 | 2 | 3 | 4 | 5 |
| 8. Hearing aids are overpriced. | 1 | 2 | 3 | 4 | 5 |
| 9. I wouldn't want a hearing aid to be visible to others. | 1 | 2 | 3 | 4 | 5 |
| 10. Hearing aids make sounds too loud. | 1 | 2 | 3 | 4 | 5 |
| 11. Hearing aids are uncomfortable to wear. | 1 | 2 | 3 | 4 | 5 |
| 12. I don't think a hearing aid would help me. | 1 | 2 | 3 | 4 | 5 |
| 13. A hearing aid would make me nervous. | 1 | 2 | 3 | 4 | 5 |
| 14. Hearing aids are a sign of aging. | 1 | 2 | 3 | 4 | 5 |

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|--|---|---|---|---|---|
| 15. Hearing aids make you appear inferior to others. | 1 | 2 | 3 | 4 | 5 |
| 16. Two hearing aids make you appear twice as hearing-impaired. | 1 | 2 | 3 | 4 | 5 |
| 17. Hearing aids are only for the most severe hearing losses. | 1 | 2 | 3 | 4 | 5 |
| 18. The use of the hearing aid was fully explained to me by the audiologist. | 1 | 2 | 3 | 4 | 5 |
| 19. Family members are not supportive of my trying a hearing aid. | 1 | 2 | 3 | 4 | 5 |
| 20. People I know with hearing aids are dissatisfied with them. | 1 | 2 | 3 | 4 | 5 |
| 21. People with nerve deafness can't use hearing aids. | 1 | 2 | 3 | 4 | 5 |
| 22. People with hearing aids can tolerate more loudness than others. | 1 | 2 | 3 | 4 | 5 |
| 23. People can either hear normally or they are deaf. | 1 | 2 | 3 | 4 | 5 |
| 24. Others have suggested I try a hearing aid. but I don't think I need one. | 1 | 2 | 3 | 4 | 5 |
| 25. I am afraid I would not get the right hearing aid. | 1 | 2 | 3 | 4 | 5 |

APPENDIX D

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The survey questionnaires are coalated so that there are two pre-fitting questionnaires, a post-fitting questionnaire, and an envelope for each questionnaire per client (three questionnaires and three envelopes). The questionnaires are coded with a number and an A, B, or C in the upper left hand corner. This is to insure accurate data collection. For example, a client might fill out the pre-fitting questionnaires coded 1A and 1B, and the post-fitting questionnaire would have the code 1C.

When an appointment is made for a hearing aid evaluation, a set of questionnaires and envelopes should be placed in that client's file.

Pre-fitting Questionnaire #1

1. The first questionnaire is to be completed upon the client's arrival for the initial hearing evaluation. It is critical that this pre-fitting questionnaire be completed prior to any audiological counseling.
2. The receptionist should place the completed survey in the envelope provided and seal it as it is important that the subjects are assured of confidentiality.
3. When you have completed the hearing evaluation, check to see that the client meets the following criteria:
 - hearing aid cost is not covered by the Veteran's Administration, Medicaid, or any other insurance agency,
 - the client is age 50 years or older,
 - has a sensorineural hearing loss, and
 - has a 3 frequency PTA (.5, 1, and 2kHz) of 30 dB HL or worse.

If the client does not meet all of these criteria, place a checkmark on the back of the sealed envelope beside the statement "does not meet criteria".

4. Please return promptly. (Also questionnaires 2 & 3 if the client fails to meet the above criteria.

Pre-fitting Questionnaire #2

The second questionnaire should be completed by all clients who meet the aforementioned criteria. It is to be completed following testing and counseling by the audiologist. This questionnaire may be turned in to the receptionist or it can be mailed in by the client.

Post-fitting Questionnaire

All clients, including those who discontinue use or return their hearing aids after your trial period should complete the post-fitting questionnaire. The completed post-fitting questionnaire should be returned to the receptionist or it may be mailed in by the client.